

MAY
SPECIAL

3D PRINTING SPECIAL



**micro
mart**

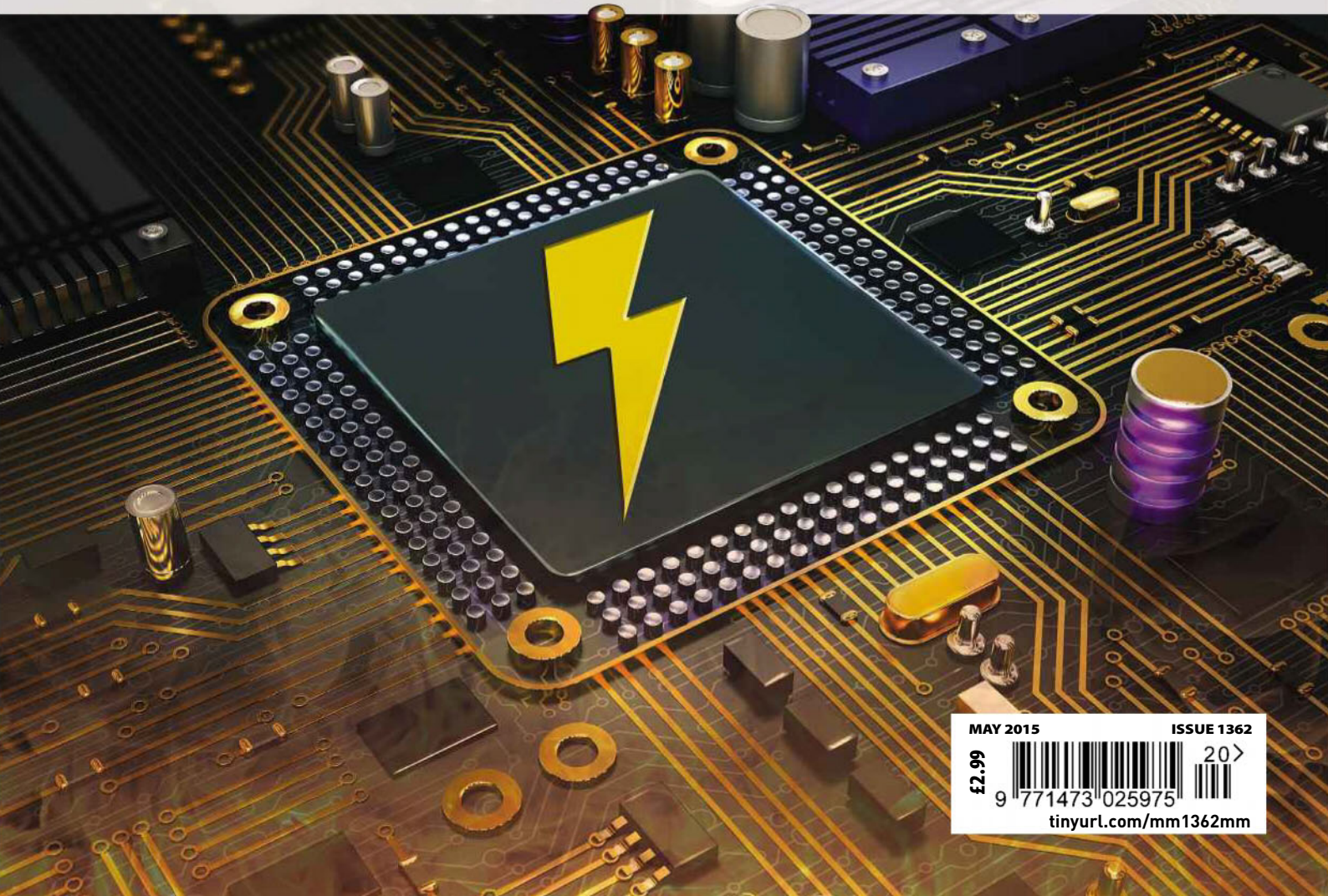
Computing in the know

Plus

- What To Do When Your PC Won't Start
- 100% PC Security The Lazy Way
- Why Windows 10 Matters Now More Than Ever

PERFORMANCE
MOTHERBOARDS

6 GAMING MOTHERBOARD BUNDLES TESTED
WHICH OFFERS THE MOST FOR YOUR ££££?



MAY 2015

ISSUE 1362

£2.99



9 771473 025975

20 >

tinyurl.com/mm1362mm

NETGEAR®



Smart Home Security Camera

No cords. No wires. No worries



100% Wire-Free



HD Quality



Weatherproof



Night Vision



Motion Alerts



Cloud Storage

Arlo IP cameras are 100% wire-free and they instantly attach to a fully magnetic mount for simple setup. Just connect the base station to your WiFi router, sync your cameras, fire up the free Arlo app, and you're done in minutes. Move the cameras around your house by snapping them in and out of their magnetic mounts, or simply place on any flat surface.

Smart, Safe, and Affordable

call: **08000 50 10 10**

visit: www.cclonline.com/pc email: pcsales@cclonline.com

find us: CCL Computers Ltd, Inmoor Road
Off Cross Lane, Bradford, BD11 2PS

Prices correct at time of going to publishing
(5th May 2015). Images & case designs
are for illustrative purposes only call for details.
Monitors and desktop bundles are available separately.



www.cclonline.com



Find your perfect Gaming PC at CCL

“ Custom Build Enthusiast
Gaming Home & Family
 Value for Money 3 Year Warranty ”
 Performance Find your perfect PC at CCL

Why choose CCL for your new PC?

FREE Next Day Delivery

FREE Help and Support

3 Year Warranty as Standard

CCL Elite Talon III Gaming PC



Windows 8.1
 AMD Athlon 5350 2.1GHz CPU
 4GB DDR3 Memory
 Asus AM1M-A Motherboard
 NVIDIA GeForce GTX 750
 1000GB Hard Drive
 DVD Drive
 Built-in Wi-Fi
 3 Year Collect & Return Warranty

Pre-Installed with Windows 8.1

£357.99

Inc VAT & Delivered

GTX 750
Graphics

CCL Elite Hawk IV Gaming PC



Windows 8.1
 AMD FX 4350 Quad Core 4.2GHz CPU
 8GB DDR3 Memory
 Asus M5A78L-M/USB3 Motherboard
 NVIDIA GeForce GTX 750 Ti
 1000GB Hard Drive
 DVD Drive
 3 Year Collect & Return Warranty

Pre-Installed with Windows 8.1

£497.99

Inc VAT & Delivered

GTX 750Ti
Graphics

CCL Elite Raven IV Gaming PC



Windows 8.1
 Intel Core i5 4690 3.5GHz CPU
 8GB DDR3 Memory
 Gigabyte GA-B85M-D53H Motherboard
 NVIDIA GeForce GTX 960
 1000GB Hard Drive
 DVD Drive
 Built-in Wi-Fi
 3 Year Collect & Return Warranty

Pre-Installed with Windows 8.1

£679.99

Inc VAT & Delivered

GTX 960
Graphics

CCL Elite Strix Gaming PC



Windows 8.1
 Intel Core i5 4690K 3.5GHz CPU
 16GB DDR3 Memory
 Asus Z97-Pro Gamer Motherboard
 NVIDIA GeForce GTX 960
 250GB SSD, 3TB Hard Drive
 DVD Drive
 Built-in Wi-Fi
 3 Year Collect & Return Warranty

Pre-Installed with Windows 8.1

£1079.99

Inc VAT & Delivered

16GB DDR3
1866MHz

CCL offer a great range of PCs tailored to your individual needs from a family PC right up to a bleeding edge gaming monster! If you already know exactly what you want then speak with us about a custom PC made just for you!

Why not simply pick your components and we'll build it for you!

You Design It, We Build It

call: **08000 50 10 10**

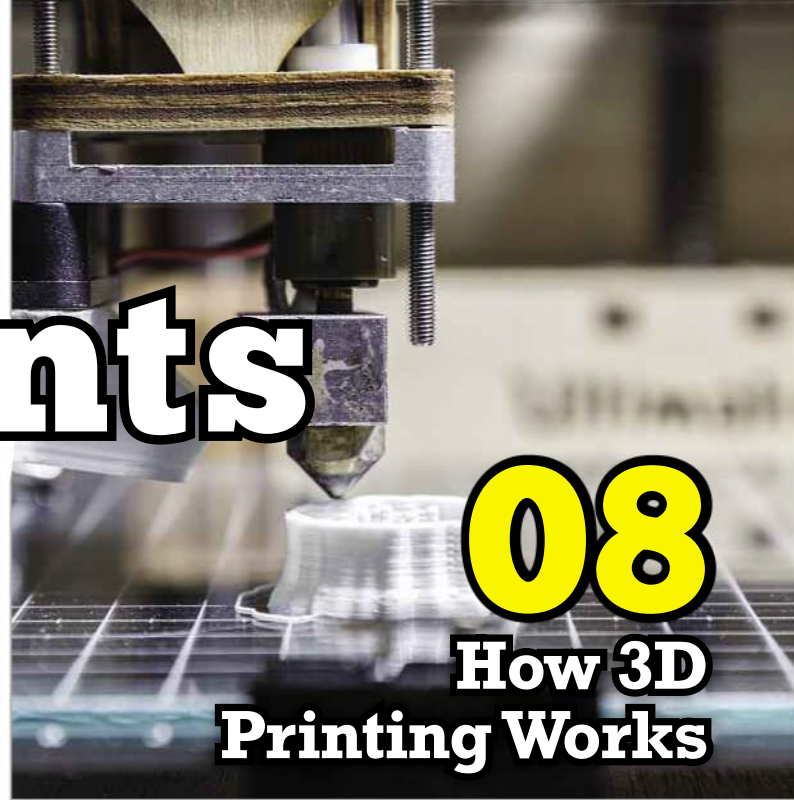
visit: www.cclonline.com/pc email: pcsales@cclonline.com

find us: CCL Computers Ltd, Inmoor Road
 Off Cross Lane, Bradford, BD11 2PS

Prices correct at time of going to publishing (5th May 2015). Images & case designs are for illustrative purposes only call for details. Monitors and desktop bundles are available separately.

Contents

This week...



08

How 3D Printing Works

08 How 3D Printing Works

What better way to kick things off this week than to look at what actually makes 3D printers tick? You might know the basics, but there's more to it than you might think...

16 Self-build Vs Consumer Printers

To some people, the idea of building a printer isn't an inconvenience but a welcome challenge. But it's not for everyone. If you're on the fence about which type of printer you need, then maybe we can help

20 3D Printer Design Guide

Getting a printer is only the first part in your adventure. The next step is to find something to actually print. That might mean designing your own objects, but there are also plenty of already created designs on the internet, just as long as you know where to look

26 Crowdfunded Printers

One of the best places to find new 3D printers is through sites like Kickstarter. However, there's one small problem: often they don't actually exist yet, and if they do, it's in very small numbers. Of course, that's how crowdfunding works, but are there other problems with this model you need to think about?

28 Printing Outside The Home

Although we haven't yet seen a 3D printing revolution in the home, the technology has been used in other settings for quite some time. James Hunt takes a look at who's using it and what they're using it for



16

Self-build Vs Consumer Printers



20

3D Printer Design Guide



36 100% Security For Lazy People

54 What Do To If Your PC Won't Start

32 The Future Of 3D Printing

It's still relatively early days for home 3D printing, so there's no doubt that things are going to change and improve rapidly. But what can we actually expect in the coming months and years? Well, we can't be sure, but we can definitely make a few educated guesses!

36 100% Security For Lazy People

Everyone knows by now that it's important to use strong passwords, but there's a lot more to good security than this. The only problem is it's a lot of hard work. Thankfully, though, it doesn't have to be. With our special guide, you can stay safe without breaking a sweat

54 What Do To If Your PC Won't Start

Pushing your PC's power switch only for nothing to happen is never a good thing, and often it can seem like there's no way to find out what's wrong. What you can do, though, is eliminate a few things until you hone in on the problem. James Hunt provides some handy tips for just that purpose

86 Windows Last Dice Roll

With Windows 10 around the corner and a bunch of new plans announced, Microsoft is at a crucial moment in its life. It's been losing money in various sectors, and it's now looking to change the way it works to reverse that, but will it be enough, wonders Mark Pickavance

Also In This Issue...

40 Microsoft Research: Images And Graphics

David Briddock continues his look at Microsoft latest ideas

46 Component Watch

Need a Bluetooth dongle? One of these deals could be for you

76 Download Directory

More web-borne software for you, chosen by James Hunt

82 Retro Round-up

Dave Edward reports back from the retro frontline

110 Crowdfunding Corner

Looking for something new to spend your money on? Look no further

111 App Of The Week

A bit of gaming fun this week. Apples are involved

114 Frustrations

Sarah Dobbs finishes the series by raging against the web

Group Test Gaming Motherboard Bundles

- 68 OC Recon Anniversary Intel Bundle
- 69 Scan MSI Z97 Gaming 5 Bundle
- 70 OC Gigabyte Magma Z97 bundle
- 71 CCL Alpha Brilliant Bundle
- 72 Palicomp Overclocked i7 Ranger Bundle
- 73 OC Breeze MSI X99 Bundle
- 74 Sum up

Reviews

- 60 Ruark Audio R1 Mk3 Home
- 61 HP Envy 360x 15-u000na Laptop
- 64 Benq RL2755HM
- 65 Quiet PC Mono All-in-One
- 66 Movavi Video Editor

Experts

- 106 Ask Aaron
- 108 Ask Jason

Specialists

- 92 Linux Mart
- 93 Mac Mart
- 94 Mobile Mart
- 95 Hardware Mart
- 96 Gaming Mart

News

- 48 The Latest News
- 75 Your Letters

Regulars

- 34 Subscriptions
- 98 Ad Index
- 100 IT Essentials
- 101 Classifieds
- 112 Logging Off



SAVE A BUNDLE

Subscribe to Micro Mart today and save 24% on the shop price.

Call 0844 844 0082

Basic annual rate

UK: £77.50

Europe: £185

Rest of World: £340

Online subscriber service

Change your address and renew your subscription at

www.subsinfo.co.uk

Email:

micromart@servicehelpline.co.uk

SUPERB MORGAN BARGAINS • WITH EXTRA 10% DISCOUNT! MASSIVE COMPUTING SALE! WITH AN EXTRA 10% DISCOUNT

Get an extra 10% OFF your new sale item or almost anything on our site!

Just visit our website today www.morgancomputers.co.uk

Enter the promotional code **MMTEN** at the checkout online and see your prices reduce by an extra 10%! OR call **FREephone 0800 008 7451** and we'll do the work for you!

WESTERN DIGITAL 1TB HARD DRIVE



- Size/Bay Height: 3.5" x 1/3H
- Capacity: 1 Terabyte
- Cache (MB): 32
- Interface: Serial ATA-600
- Transfer Rate: 600 MBps
- Internal transfer Rate: 110 MBps
- Buffer Size: 64 MBps
- Spindle Speed (RPM): 7,200
- Shock Tolerance Operating: 65 g @ 2ms
- Size (WxDxH): 10.2 x 14.7 x 2.6 cm
- Weight: 0.6 kg

State of the art, top specification, top brand internal hard drive

MODEL WD10EURX 1TB

WD Western Digital

Part Code: 41663

NOW ONLY
£26.96



HP 8000 ELITE SPECIAL!

Now with an incredible 8GB DDR3 RAM, a Massive 1TB HDD, WiFi and a 1GB Graphics card the reliable and powerful 3.0GHz Core2Duo Intel processor will make short work of most tasks!

- Intel Core 2 Duo E8400/3 GHz (Dual-Core)
- 3.0 Ghz • 8GB RAM (installed)/16 GB (max)
- 1TB - SATA • DVD/CD • Stereo Sound
- Network: Wi-Fi & Gigabit LAN • Asus G210 Graphics
- Ultra Small: 33.8 cm x 37.9 cm x 10 cm
- Windows 7 Professional Operating System

TOP SPEC! LOW PRICE!

NOW ONLY
£224.96

AMAZON KINDLE FIRE HDX 7" - SPECIAL BARGAIN BUY!



QUAD CORE! POWER!



amazon kindle **BARGAIN**

Instantly watch anytime on your Kindle Fire. Buy or rent from a huge selection of more TV episodes and Films than all TV channels put together. Subscribe to Prime and enjoy unlimited streaming of thousands of popular films and TV shows from Britain's largest subscription streaming service.

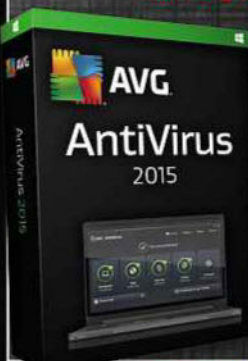
- Quad Core Processor
- Stunning HD display
- 1920x1200 HD Res
- 4Gb RAM/16Gb Storage
- Wi-Fi, Bluetooth, 3G/4G
- Fast web browsing
- Mojito OS
- Front-facing camera

CURRENT ARGOS PRICE ~~£269.99~~ CURRENT JOHN LEWIS PRICE ~~£269.99~~

NOW ONLY
£152.96

AVG ANTIVIRUS 2015

1 Year 1 User Download Code
Delivery Within 1 Working Day via eMail



The backbone of your PC's security system - offers protection from a range of IT threats and provides the basic tools needed to protect your PC!

Protect your computer from harmful malware and viruses with this superb AVG Anti Virus pack. This pack provides protection against spyware, trojans and phishing, as well as providing a wide range of privacy options.

AVG ONLINE PRICE ~~£23.99~~

NEW LOW PRICE!

NOW ONLY
£7.16

Part Code: 41185

HP PAVILION 15.6" QUAD CORE LAPOP

Top spec full size quad core
Windows 8 HP laptop with 8Gb
RAM and a fast 1TB hard drive!



QUAD CORE!

- 1.6Ghz AMD A8-4555M Quad Core processor
- 8Gb RAM
- 15.6" 1366 x 768 (pixels) Hi-Res Ultra Bright Screen
- 1Tb HD • Wi-Fi • Bluetooth
- Ethernet • Silver magnesium chassis
- AMD Radeon HD 7600G Graphics
- HDMI • Only 2.3kg
- Windows 8.1 OS

NOW ONLY
£269.96

Part Code: 41899

BARGAIN!

PLUS! AN EXTRA 10% DISCOUNT

Buy any of these products and claim a special MicroMart readers **ONLY** extra 10% discount!

Go to our website and place your order for any of these superb offers. Enter your special promo code **MMTEN** at the checkout online and see your order reduce by an extra 10%!

E&ED. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.

All Prices include VAT
Monday to Friday
8.30AM TO 6.00PM

MorganComputers



SUPERB MORGAN BARGAINS • WITH EXTRA 10% DISCOUNT!

LENOVO THINKPAD T520 15.6" LAPTOP



WINDOWS 7 HOME PREMIUM, BIG SCREEN BIG SPEC - LOW PRICE!

As new top quality! This full size laptop has almost everything. 15.6" HD LED Screen, 2.5GHz 2nd Gen i5 Processor, Webcam, Windows 7 with a FREE upgrade to Windows 10 when released. Sold with a 12 month warranty for total peace of mind. Will satisfy the most demanding & fastidious customer!

- Processor: Intel Core i5 (2nd Gen) 2520M
2.5 GHz (3.2 GHz) / 4 MB Cache
- Memory: 4 GB DDR3 ● Storage: 320 GB HDD
- Display: 15.6" LED backlight 1600 x 900 / HD
 - Graphics: Intel HD Graphics 3000
- Networking: Wireless, Ethernet, fax /modem, 3G upgradable
 - WebCam: Built-In ● Weight: Only 2.5 kg
- Size: (WxDxH) 37.3 x 24. x 3.6 cm ● OS: Windows 7

IBM
lenovo
ThinkPad



SPECIAL NEW PRICE WITH AN EXTRA 10% DISCOUNT

NOW ONLY
£269.06

APPLE iPhone 4S 16GB BLACK

60% LESS THAN RRP!

Refurbished & Unlocked Ready for any Network SIM card!

Use on any of these networks



.. and many more!

With 12 Month Warranty

- Dual-core 1 GHz Cortex-A9 processor ● 3.5" LED-backlit IPS LCD, capacitive multitouch touchscreen with 640 x 960 pixels and 16M colors ● 8 MP, HD 3264 x 2448 pixels, autofocus, LED flash primary camera ● VGA, 480p@30fps, videocalling over Wi-Fi and 3G ● Wi-Fi
- Bluetooth v4.0 ● Accelerometer, gyro, proximity & compass sensor ● GPS with A-GPS & GLONASS ● Up to 14Hr Battery Life (2G talk time) ... and much more

SPECIAL NEW PRICE WITH AN EXTRA 10% DISCOUNT

NOW ONLY
£161.96

RRP AMAZON
~~£499.95~~
 wi-fi 16Gb



Part Code: 489127

PRICES SHOWN

INCLUDE AN EXTRA 10% DISCOUNT
Buy any of these products and claim a special MicroMart readers only extra 10% discount!

Go to our website and place your order for any of these superb offers at our standard discount price. Enter your special promo code **MMTEN** at the checkout online and see your order reduce by an extra 10%!

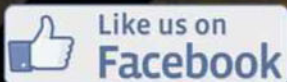
E&O. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.

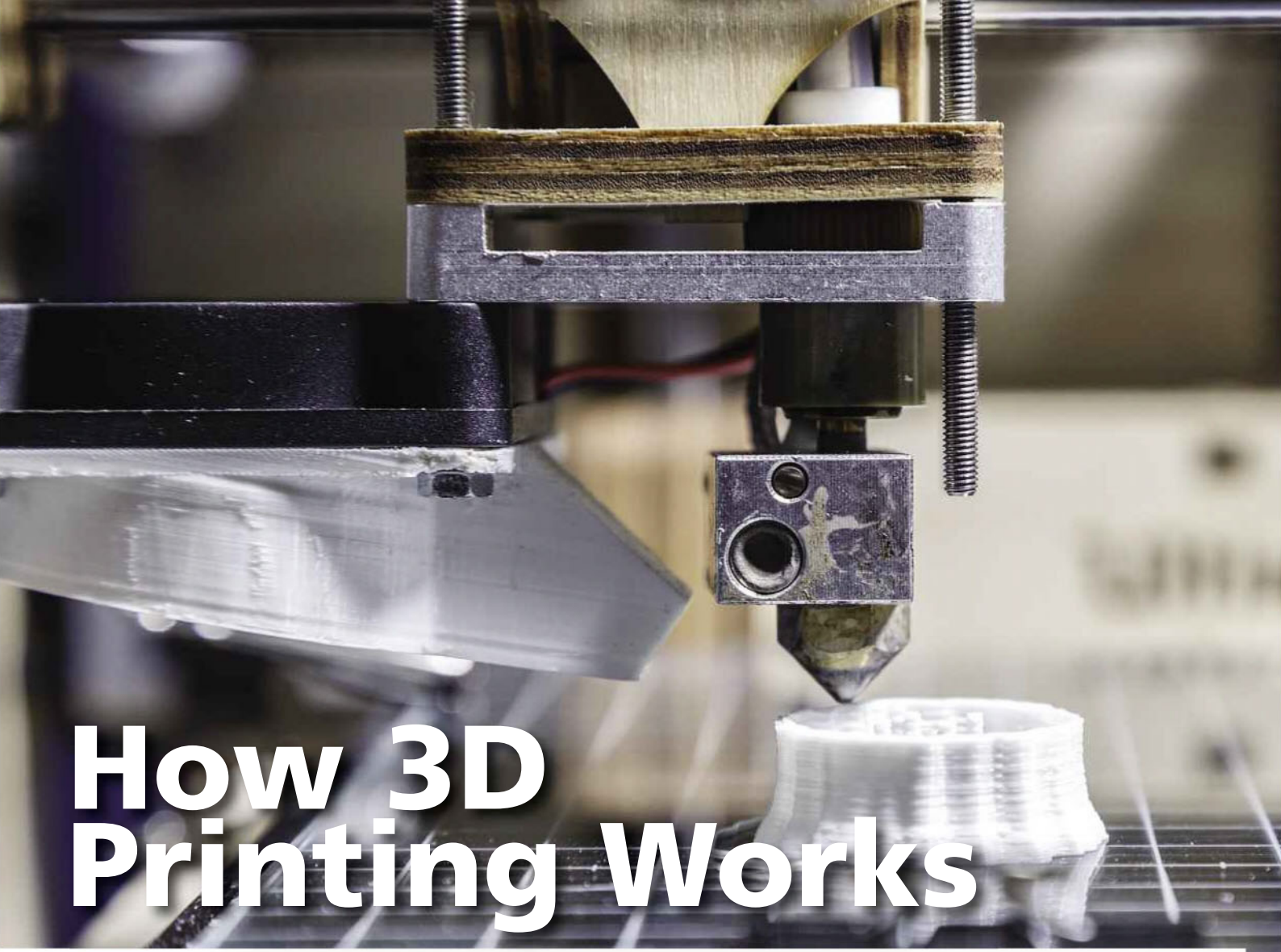
www.morgancomputers.co.uk

Or Call FREEPHONE 0800 008 7451

All Prices include VAT

Monday to Friday 8.30AM TO 6.00PM





How 3D Printing Works

A Beginner's Guide

What makes this fascinating technology tick?

3D printing has been around for some years now, but its nature as a specialist part of the computing canon (no printing puns intended) means many of us only have a cursory knowledge of how it works and what's involved.

As 3D printing becomes more common and more prominent in our daily lives, it's worth going back to basics to make sure you understand the ins and outs of 3D printing, from the materials and processes involved to the hardware terminology. If you've never touched a 3D printer, don't worry – this guide will make you feel like you know exactly what goes where and why.

What Is 3D Printing?

Let's start with the basics. A 3D printer is exactly what it sounds like: a device that can

'print' 3D objects out of a specific material – usually a form of thermoplastic, but it can also be a number of offbeat alternatives, from chocolate to stem cells. Any material that can be turned from a liquid into a solid quickly enough can be used to 3D print things.

Just as printers move a print head back and forth, depositing blobs of ink on a page, 3D printers move print heads back and forth, as well as up and down, depositing blocks of material to build up a 3D model layer by layer. It's a bit like making a loaf of bread by baking one slice at a time and assembling the full loaf piece by piece. You essentially turn a collection of 2D 'slices' into a 3D 'loaf' – only instead of slices of bread, it's slices of plastic (usually).

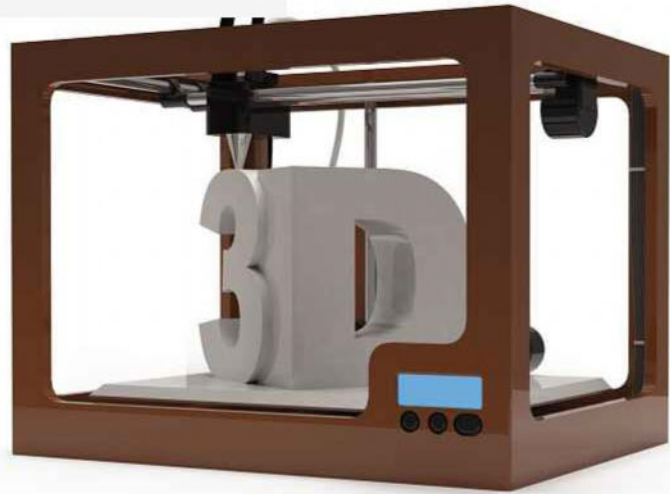
This can be accomplished in one of two ways. The most common way is for a printer to accept a thermoplastic filament, which is

melted into a liquid, extruded through a nozzle and then allowed to quickly cool back into solid plastic. A second technique uses powder that is laid onto a surface like standard ink and then quickly melted using a laser or other heat source, similar to the way a laser printer fuses toner to paper.

Where normal printers are used to turn on-screen text into text on a page, 3D printers accept 3D inputs, which can be created using modelling software or, more frequently, downloaded from the internet. 3D print models can be incredibly complex, to the point where it's possible to create working joints and hinges in a single go.

It might sound gimmicky, but the possibilities are considerable. If you break something important, like a connector for flat-pack furniture or part of a toy only to find that

A 3D Printer



“ Home 3D printing filaments come in two different materials, ABS and PLA, each of which has its own strengths and weaknesses ”

of the technology itself. While the 3D printer may never be an essential piece of home electronics like the TV or computer eventually became, certain individuals and businesses – designers and engineers – will get huge benefits from having them around. One day, the idea of having to wait for replacement car parts to be delivered could be replaced by simply having to wait for them to print. They might not make it into the home, but by the end of the decade, it's a safe bet that they'll have made it into your life one way or another.

3D Printing Terminology

As with any specialist area of technology, 3D printing comes with its own terminology and language. It's hard to discuss the topic unless you're equipped with the right language, so before we go any further we'll explain some of the most essential concepts and hardware you might encounter.

- **Bed/Build-Plate**

The 'base' of a 3D printer, which is where the first layer of the object is laid down. Beds can be either heated (hot beds) or unheated (cold beds). Hot beds are more expensive and power-hungry, but prevent uneven cooling of the printed material, which can cause cracks and warping.

- **DIY/Self-Build/Kit Printers**

The enthusiast nature of the 3D printing industry means it's not uncommon to have to assemble a 3D printer yourself, even if a company provides the parts for you. Some 3D printer kits actually require you to print parts yourself once the printer has been partially assembled!

- **Extruder**

Extruders are the 3D version of a print head. They consist of a cold end, which pulls in the build material, and a hot end, which melts and extrudes the material so it forms the object you're trying to print.

- **Filament**

Most build material comes in the form of filament, a thin plastic wire that is supplied in a spool. Be careful of context, as it may also refer to the heated wire at the hot end of the extruder. Filament designed for home use is most commonly made of either PLA or ABS, both of which you can read more about in our next section.

- **Raft**

While you can print objects without a base, some people prefer to include a 'raft' in their designs. Rafts are disposable bases that are printed onto a build plate first, so

it's inconvenient or impossible to replace, you could simply use your 3D printer to replace it. The dream most enthusiasts imagine involves a Star Trek-style future where you don't have to go to a shop to buy an item; you can simply 3D print it at home, to the exact requirements you have.

The benefits of this are clear in individual cases: you don't need to wait for a factory production line to create your bespoke items, and you can create parts that might otherwise not be sold, but the economics don't necessarily line up. At present, 3D printing costs mean anything you create will be more expensive than buying it (assuming that's possible), and in most cases the item won't match the quality of factory-produced goods. The range of materials is also quite small.

But like any technology, the affordability of 3D printers and their materials are bound to improve, as will the capabilities

the object can be printed on top of it. Rafts provide greater adhesion and reduce the risk of warping, though the cost of this is that they must be manually removed once the item is complete.

- **Build Area**

Just as normal printers have restrictions about how much of a page they can physically print on, 3D printers have limitations about the size of items they can build, which are determined by the bounds of the X, Y and Z tracks of the printer. The easiest way to think of it is that if you have a box the size of a 3D printer's build area, any individual part you make will be able to fit inside it.

- **Resolution**

This can be either horizontal (XY) or vertical (Z). Horizontal resolution is sometimes called 'feature' resolution and refers to the smallest movement the extruder can make on a layer. The smaller the better. Vertical resolution (also called 'layer thickness') is the minimum thickness of the layers that the printer can create. Smaller thicknesses are better for creating a smoother layer, but the thinner they are, the more each object requires and the slower the print speed.

Filament: ABS

Home 3D printing filaments come in two different materials, ABS and PLA, each of which has its own strengths and weaknesses. Both are thermoplastics that melt under high temperatures but quickly solidify once the heat is removed, and that property makes them perfect for 3D



“ Like any technology, the affordability of 3D printers and their materials are bound to improve ”

printing. Assuming your hardware supports both types, the main question you have to answer is which is more appropriate for the item you're trying to print. And if you don't know the difference, allow us to explain.

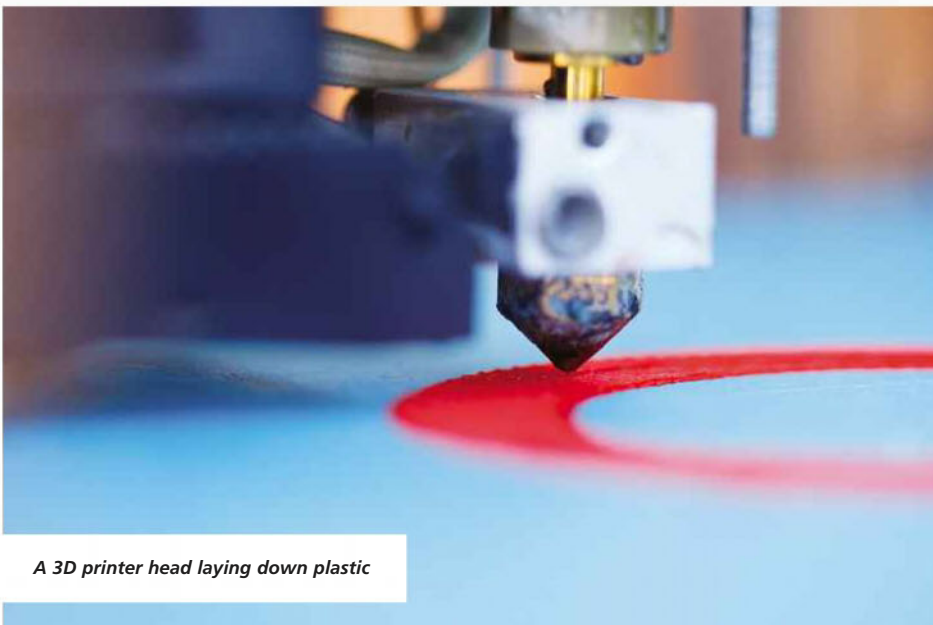
ABS (acrylonitrile butadiene styrene) is the older of the two materials. The temperature at which it starts to soften is quite high, 40°C (100°F), which means

there are home uses for which it would be suitable where other materials wouldn't. A hot drinks coaster would definitely be in trouble of losing its shape if made with PLA, and so might a phone case or laptop stand depending on how hot your device gets. ABS should withstand such heat easily.

To use ABS properly, a printer needs to heat its filaments to at least 100°C (210°F) and a heated bed of around 26°C (80°F). ABS is relatively slow to cool, so in its fluid state it doesn't tend to clump together and form jams or clogs, but it does shrink a little as it sets, which can cause some items to lift from the bed or even split between layers when the object gets tall enough.

The use of a heated bed can help prevent cooling problems with ABS by making sure the object doesn't cool too quickly, and enclosed-case printers also trap warmth and eliminate drafts. That way, the object cools evenly and is more likely to remain intact.

Once cooled, ABS is very resilient. If printed correctly, it'll bend rather than snap, and its flexibility makes it a popular choice for bracelets and other wearables. It's rugged enough for phone cases and toys, and it can put up with the high temperatures inside cars during summer, so unless you're taking it into some seriously extreme conditions, ABS should cope with whatever you throw at it.





cube

DESIGN YOUR ULTIMATE CUSTOM PC

Box Limited recommends Windows



Intel X99 Available Now!



CASE



CPU



GRAPHICS



STORAGE



+ RAM, COOLING, MOTHERBOARD & MORE

YOUR PC - YOUR CHOICE - DEFINE YOUR DESTINY!

Configure yours now at box.co.uk/custom

Cube Panther Gaming PC



- MSI NVIDIA GeForce GTX 960 2GB
- Intel Core i5-4460 CPU
- **Windows 8.1**
- 8GB DDR3 HyperX RAM
- 1TB SSHD
- 2 Year Warranty



From **£699***

Mini Phantom Gaming PC



- MSI NVIDIA GeForce GTX 960 2GB
- Intel Core i5-4690K CPU
- **Windows 8.1**
- 16GB DDR3 HyperX RAM
- 1TB SSHD + 120GB SSD
- 2 Year Warranty



From **£999***

Cube DS200 Gaming PC



- MSI NVIDIA GeForce GTX 960 2GB
- Intel Core i5-5820K CPU
- **Windows 8.1**
- 16GB **DDR4** HyperX RAM
- 1TB SSHD + 240GB SSD
- 2 Year Warranty



From **£1199***

Buy online at www.box.co.uk Or visit our Birmingham Store



*Prices & offers are correct at time of going to press and are subject to change without notice. Nothing in this advert forms part of any contract. Prices are inclusive of VAT at the current rate of 20%. Box.co.uk is a trading name of Box Limited.

One of the problems with ABS is that it emits strong fumes during printing. They're not poisonous in any quantity that would be generated during normal use, but the smell is strong and may overpower some people. Ventilation will definitely help, but if you're sensitive to smell, then it's definitely worth taking into account when you decide which material to go for.

Filament: PLA

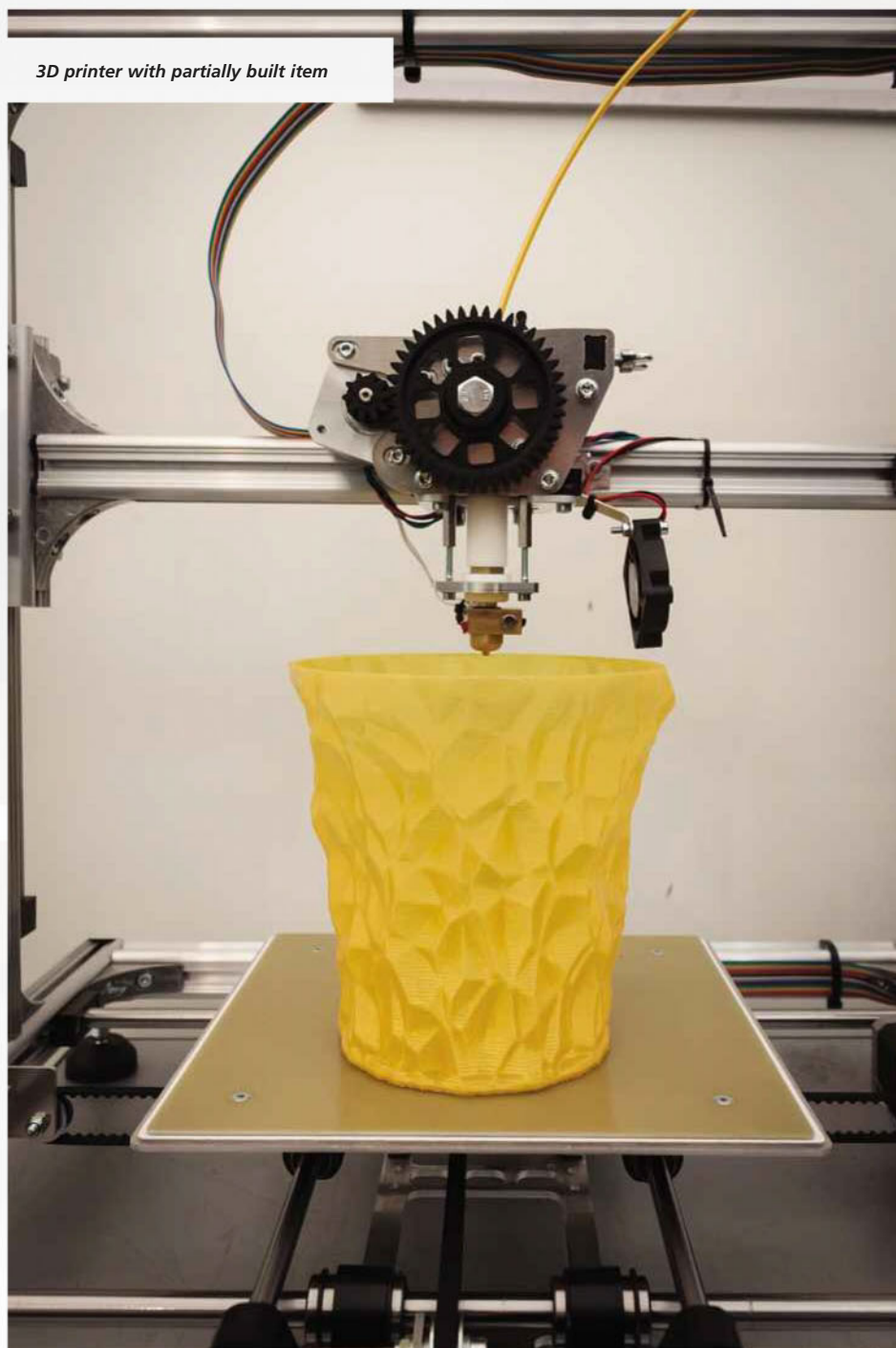
The alternative material is PLA (polylactic acid), which has the immediate benefit of smelling much sweeter when it prints – a little like acetone. PLA prints at a slightly lower temperature than ABS – 80°C (180°F) – and while it works fine without a heated bed, you can improve the reliability and quality of your print by running one of about 15°C (60°F)

The main problem with PLA is that it becomes malleable at a much lower temperature than ABS, which restricts its use. You can't use it as a phone case, because most phones would get hot enough to turn it into plasticine. But that's not all: PLA is also more prone to jamming in the hot end of the printer, because it expands and turns sticky when it's heated up. PLA users are advised to oil the hot-end regularly to prevent jams.

Another problem is that when cooled, it's also slightly more brittle than a lot of other plastics and certainly doesn't have the durability of ABS. Anything with thin parts and fine features (such as spikes or pegs) is likely to be vulnerable to damage if dropped or knocked. That's not to say it's too fragile for any practical purpose, but certainly, compared to ABS, it's not quite as versatile.

Given these disadvantages, the reason PLA is used is because it's a lot less sensitive than ABS. You can use open-frame printers without a hot bed and not have to worry about warped or cracked items, and that means you can see exactly how your item is being put together as it prints. PLA also has the benefit of being biodegradable. It's not so much that you'll see it fall apart in a matter of weeks, though, so you can still use it for outdoor materials. PLA needs heated composting to decompose, and it's not soluble, so you can leave it outdoors or dunk it in water without having to worry.

At this point, it's worth making it clear that while most printers can use either material, not all printers can. Any printer capable of using ABS filament should be fine with PLA filament, but printers intended for use with PLA filament may struggle to reach the temperatures required to use ABS – not to mention that it's common for PLA printers to lack a heated print bed, which is bad news for ABS, while PLA is



not negatively affected by the lack or presence of one. In any case, it's worth checking for definite whether your printer is compatible with the filament you want to use. If you get it wrong, you could end up with a very expensive mess on your hands!

Getting Started?

If you've made it this far through the article, you should understand the basics of 3D printing hardware, terminology and technologies, but there's still a lot more to

get to grips with, much of which can only be learned by doing. 3D printers aren't cheap, but it's not impossible to get one for a few hundred pounds, which isn't a bad entry-level price for a hobby. We'd recommend sticking to small consumer units to begin with and maybe even trying the software out before you buy one. It's definitely a complicated thing to do with your time, but look at it this way: if you can master 3D printing, now you'll be ahead of the curve when it really takes off! [mm](#)

Gaming
Starts Here



Vapor-X R9 270X

HD Gaming starts here. Award winning Vapor-X cooling designed for gamers. 2GB of 256 bit GDDR5 memory with BOOST.



Vapor-X R7 250X

Gaming starts here. Experience premium multimedia, play MOBA games @ 100 fps! Award winning Vapor-X cooling designed for gamers.

SAPPHIRE Vapor-X™
Cooling Designed for Gamers

The **SAPPHIRE R9 270X** and
R7 250X Vapor-X Graphic Cards

RADEON™ is gaming.



SAPPHIRE
www.sapphiretech.com

©2014 SAPPHIRE Technology LTD. All rights reserved. AMD, the AMD Arrow logo, Radeon and combinations thereof are trademarks of Advanced Micro Devices, Inc. (©2014 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, AMD OverDrive, Radeon and combinations thereof are trademarks of Advanced Micro Devices, Inc. Microsoft and DirectX are registered trademarks of Microsoft Corporation in the United States and/or other jurisdictions. Other names are for informational purposes only and may be trademarks of their respective owners.

Performance without compromise



Infinity 7850K

- AMD A10-7850K APU
- ASUS® A88XM-PLUS
- 8GB HyperX FURY RAM
- Integrated AMD Radeon™ HD 8000
- 2TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM **£499***



Vanquish HAF III

- Intel® Core™ i5-4590
- ASUS® H81-Gamer
- 8GB HyperX FURY RAM
- 2GB NVIDIA® GeForce® GTX 960
- 120GB Kingston SSD
- 1TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM **£769***



Minerva

- Intel® Core™ i5-4690K
- ASUS® RoG MAXIMUS VII RANGER
- 16GB HyperX FURY RAM
- 4GB NVIDIA® GeForce® GTX 970
- 120GB Kingston HyperX 3K SSD
- 2TB Hard Drive
- **Windows 8.1**
- 3 Years Warranty

THIS SPEC FROM **£999***



Predator X99

- Intel® Core™ i7-5820K
- ASUS® Z99-S
- 16GB HyperX FURY RAM
- 8GB AMD RADEON™ R9 295X2
- 240GB HyperX 3K SSD
- 2TB Seagate SSHD
- **Windows 8.1**
- 3 Years Warranty

THIS SPEC FROM **£2,299***



Optimus Nebula

- Intel® Core™ i7-4720HQ
- 15.6" Matte Full HD IPS Display
- 8GB HyperX IMPACT RAM
- 2GB NVIDIA® GeForce® GTX 960M
- 120GB HyperX 3K SSD
- 1TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM **£849***



Defiance 17

- Intel® Core™ i7-4720HQ
- 17.3" Matte Full HD LED Screen
- 16GB HyperX IMPACT RAM
- 4GB NVIDIA® GeForce® GTX 980M
- 240GB Kingston SSD
- 1TB Hard Drive
- **Windows 8.1**
- 3 Year Standard Warranty

THIS SPEC FROM **£1,349***

Order your system now with PC Specialist



pcspecialist

Award winning custom PC & Laptop manufacturer

Get a PC that's more **you**



Vortex 440

- Intel® Core™ i7-5820K
- ASUS® Z99-S
- 16GB HyperX PREDATOR RAM
- 4GB NVIDIA® GeForce® GTX 980
- 240GB Kingston HyperX 3K SSD
- 2TB Hard Drive
- Windows 8.1
- 3 Year Standard Warranty

THIS SPEC FROM **£1,599***

Quality builds at a low price
Always

GET A FURTHER £15 OFF WITH THIS EXCLUSIVE VOUCHER CODE:

MM49T

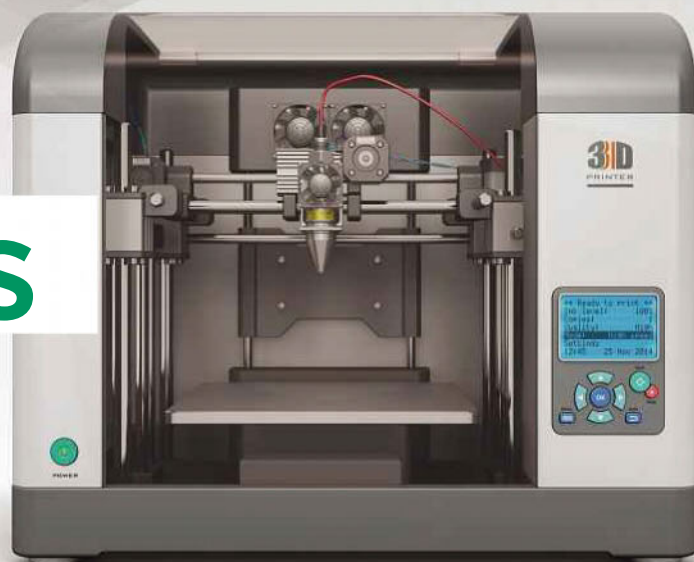
ORDER ONLINE NOW

0333 011 7000

www.pcspecialist.co.uk

Self-builds And Kits Versus

Consumer Units



There's more than one way to get a 3D printer, but which is best for you?

Although the range of 3D printers on offer is wide and varied in everything from size to technology, one thing all 3D printers have anything in common is that they're expensive. In the UK, even the cheapest models approach £500.

It doesn't necessarily have to be that way, however. If you buy a 3D Printer Kit – where all the parts are provided for you to assemble yourself you can save around £150 on the price of even a cheap 3D printer. Buy the components yourself and you can save even more money – but is a cost saving the only benefit? If not, what else attracts people to 3D printers which are considerably more complicated to set up than the ones you can buy fully assembled?

Self-builds

As the name suggests, a self-build 3D printer is one you build out of raw, unassembled parts. Indeed, in some cases you'll take it a step further: once the printer has made it to a certain level of functionality, you might actually be required to print the remainder of your device before it can be considered complete. Baptism of fire just about covers it in terms of getting yourself set up.

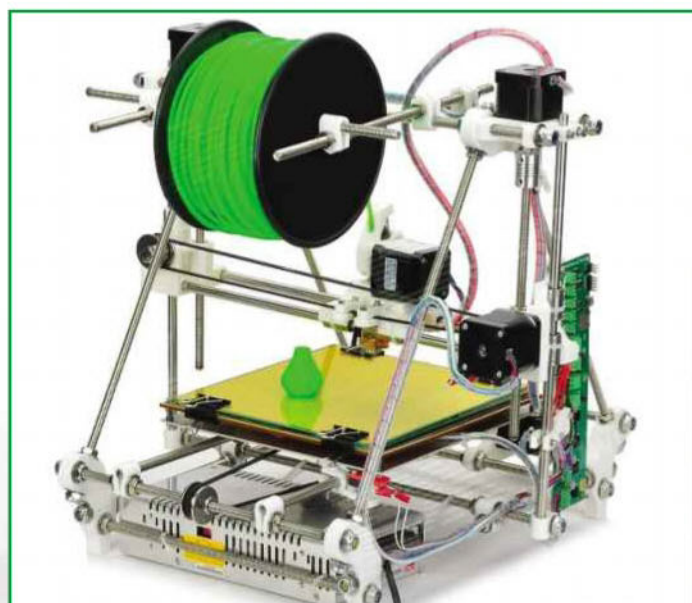
The most common version of the self-build 3D printer is a sub-set of devices called RepRaps. Short for 'REPLicating RAPid-prototypers', RepRaps were born out of attempts to create self-replicating machines. The idea is that, since most 3D printers are primarily composed of plastic, you could potentially use a 3D printer to print all of the parts you need to build another 3D printer, and RepRaps seek to get as close as possible to this goal (though separate electronics and motors are usually required) by using compatible materials and parts small enough to be reproduced in such a way.

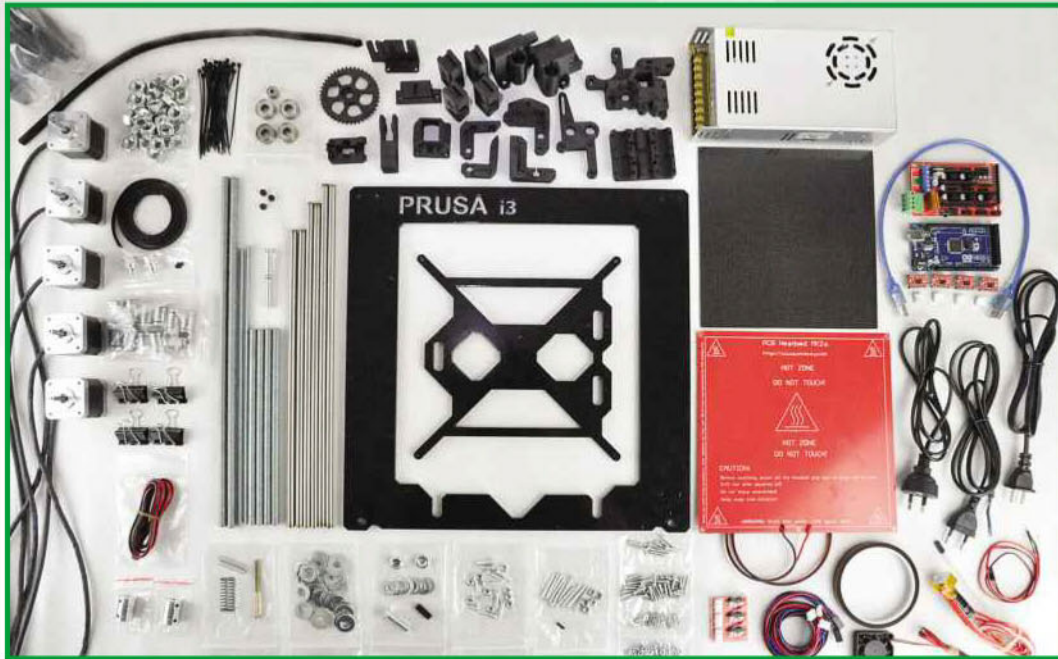
The RepRap project was the original basis for low-cost 3D printers, and it was this movement that created the open source 3D printers that now form the basis of most consumer models. Therefore, RepRaps are cheaper to make than most consumer printers, and usually quite simple, since they're designed to be both minimalist and easy to assemble.

The problem with self-build 3D printers (including RepRaps) is that there's no accepted way to create one. They all have elements in common (hot beds, a stepper motor, the control CPU), but when it

comes to actually choosing and assembling the parts, you have a million different choices for how to proceed – and that much choice can be paralyzing for some people.

While the RepRap community has probably produced hundreds of guides on how to build a device from scratch, it's probably a little too complicated for most people. While the price savings are good and the customisability is huge, your biggest investment will be time – choosing the parts, buying the parts and assembling the parts requires a lot of research and trial and error. It's worth noting that, even when you have the right parts, it's a difficult job to get right unless you truly understand how 3D printers work. Just as you wouldn't start your driving lessons by assembling a car from scratch, we think most people should be extra-cautious about starting with a self-build. It's not impossible, but it's also not the natural choice for everyone.





Kits

Kit-build 3D printers sit on the mid-point of the spectrum between self-builds and off-the-shelf models. These kits contain almost, if not actually everything you need to build a 3D printer and instructions as to how to do it. Imagine a piece of flatpack furniture from IKEA, but a lot more complicated and with moving parts, and you're more or less there.

The benefit of kits is probably obvious: a lot of the more difficult legwork is done for you, so you don't have to spend hours researching which printer you want to build, and what hardware is compatible with what other hardware, or lose days waiting for the parts to arrive once you know what you want. They're also excellent learning tools if you're hoping to make your next one a full self-build, because at least with kits you know you aren't missing anything.

The disadvantages of kit builds are that you can't really customise the device you end up with, and with customisability being one of the biggest benefits of self-builds (after cost savings, which are also reduced with kits) it's in danger of coming across like a half-way house that doesn't please anyone.

What's undeniable, though, is that they're a good way to learn. If you want to understand how a 3D printer works, building one is the best way to do that, and if you're going from a position of having near-zero knowledge about the hardware then knowing what the end result should look like is a huge advantage, as is the knowledge that you have the right parts to see to complete the job at hand.

Consumer Units

As we've already established, the clear disadvantage of consumer 3D printers is their cost. That doesn't necessarily mean they don't represent value for money, though; the advantages you get as a result of buying one could be well worth the money you

spend. Indeed, you could even save money in the long run.

For instance, the great thing about consumer 3D printers is that you don't have to build any part of them yourself. This saves you a lot of time and means you can't make mistakes half-way through construction that doom your printer to creating objects that only ever look like a pile of scrap. You might save money on a kit or self-build in theory, but not if you don't build it right first time.

Likewise, if your 3D printer needs repairing – and they're currently relatively fragile pieces of technology, just like standard home printers used to be – then you have a manufacturer who can help you sort it all out, standard parts that can be easily replaced, and maybe even a warranty to fall back on. If you need help getting something to work, be it software or additional hardware, the specs of your printer will be obvious to all involved. An off-the-shelf printer is easier to troubleshoot and maintain than something you've put together yourself, because at least you know it's been through some QA process.

Consumer units also have some other relatively minor benefits (such as looking slightly better and being a little easier to transport) but for the most part they're best aimed the extreme high and low ends of the market. If you're after something too specialist to build – or something that you don't have to build – then buying off-the-shelf is the way to go.

Whichever type of 3D printer you decide to buy, it's worth remembering that they're all an order of complexity greater than most other pieces of computer hardware you'll encounter on a day-to-day basis. You need to be interested in the hardware itself, capable with technology, and ready for things to go wrong. Whether you want a cheap kit or the most expensive off-the-shelf model, one thing's for sure: there's currently no such thing as an easy ride when it comes to 3D printers. **mm**

BEST SELLING GTX960 SYSTEM

CUBE CYCLOPS



- MSI GTX 960
- Pentium K
- Windows 8.1
- 8GB DDR3
- 240GB SSD
- 2 Year Warranty

Only **£549**

BEST SELLING GTX970 SYSTEM

CUBE REAPER



- MSI GTX 970
- Core i5-4690K
- Windows 8.1
- 8GB DDR3
- 120GB SSD
- 1TB SSHD
- 2 Year Warranty

Only **£999**

BEST SELLING GTX980 SYSTEM

CUBE PHANTOM



- MSI GTX 970
- Core i5-4690K
- Windows 8.1
- 8GB DDR3
- 120GB SSD
- 1TB SSHD
- 2 Year Warranty


Only **£1649**



www.aria.co.uk

e: sales@aria.co.uk

t: 0161 248 1611

Join us on 



OPTIMISED FOR



GLADIATOR GTAV PRO GAMING PC

PROCESSOR: Intel i5 4460 3.2GHz Quad Core CPU

GRAPHICS: NVIDIA GTX960 2048MB GDDR5

MEMORY: 8GB 1600MHz DDR3

STORAGE: 120GB Solid State Drive / 1TB SATA III Hard Drive

OPERATING SYSTEM: Windows 8.1 (64Bit)

+FREE WITCHER III GAME!

WAS £839.99 Inc.VAT

SUPER SPECIAL PRICE £699.99* Inc.VAT

QUICK CODE: 63402

* WEB ORDERS ONLY / LIMITED TIME OFFER

24" AOC 1ms Gaming Monitor -E2460SH

: Full HD / 1ms Response Time / 20Mill:1 Contrast Ratio / HDMI, DVI, VGA

WAS £125.00 Inc.VAT

SUPER SPECIAL PRICE £115.00* Inc.VAT

QUICK CODE: 61738

* WEB ORDERS ONLY / LIMITED TIME OFFER



LOGITECH 5.1 Surround Sound System

75 Watts (RMS) / Dedicated Bass Control / Multiple Inputs

WAS £79.99 Inc.VAT

SUPER SPECIAL PRICE £67.50* Inc.VAT

QUICK CODE: 53982

* WEB ORDERS ONLY / LIMITED TIME OFFER

Perixx Backlit Gaming Keyboard

: Multiple Backlit colours / Brightness Control / Multimedia Hot Keys

WAS £39.59 Inc.VAT

SUPER SPECIAL PRICE £29.94* Inc.VAT

QUICK CODE: 62344

* WEB ORDERS ONLY / LIMITED TIME OFFER



CALL

0161 248 1611

Mon - Fri 9am - 5:30pm



CLICK

www.aria.co.uk

Order online 24/7



VISIT OUR SHOP

More Great Deals!

6 days a week

Aria Technology - Aria House - 2 Belle Vue Avenue - Pottery Lane - Manchester - M12 4AS



GLADIATOR Intel i3-4150 Home/Office PC

: i3-4150 3.50GHz Dual Core CPU / 8GB DDR3 Memory / 1TB Hard Drive / 24x DVD Re-Writer
WAS £310.00 Inc.VAT

SUPER SPECIAL PRICE £280.00* Inc.VAT

QUICK CODE: 60324

* WEB ORDERS ONLY / LIMITED TIME OFFER



DELL 14" Intel i5 Refurbished Laptop

Intel i5 2.67GHz CPU / 4GB DDR3 Memory / 320GB Hard Drive / Windows 7 Professional
WAS £251.99 Inc.VAT

SUPER SPECIAL PRICE £214.99* Inc.VAT

QUICK CODE: 62643

* WEB ORDERS ONLY / LIMITED TIME OFFER

10.1" ARIA Pad with Windows 8.1 & Office 365

: Intel Atom 1.33GHz 4x Core CPU / 2GB Memory / 32GB Flash / Wifi / Webcam
WAS £197.76 Inc.VAT

SUPER SPECIAL PRICE £178.74* Inc.VAT

QUICK CODE: 63035

* WEB ORDERS ONLY / LIMITED TIME OFFER



22" BenQ Widescreen LED Monitor - DL2215

1920x1080 Full HD / 5ms Response Time / VGA, DVI-D Inputs / VESA Mountable
WAS £89.99 Inc.VAT

SUPER SPECIAL PRICE £80.39* Inc.VAT

QUICK CODE: 59203

* WEB ORDERS ONLY / LIMITED TIME OFFER

120GB Samsung 840 EVO Series Solid State Drive

: Read Speed: 540MB/s, Write Speed: 410MB/s / 94,000 IOPS / 256MB Cache
WAS £62.00 Inc.VAT

SUPER SPECIAL PRICE £51.54* Inc.VAT

QUICK CODE: 56764

* WEB ORDERS ONLY / LIMITED TIME OFFER



CALL

0161 248 1611

Mon - Fri 9am - 5:30pm



CLICK

www.aria.co.uk

Order online 24/7



VISIT OUR SHOP

More Great Deals!

6 days a week

Aria Technology - Aria House - 2 Belle Vue Avenue - Pottery Lane - Manchester - M12 4AS

3D Printer

Design Guide

Your 3D printer needs something to actually print, but what?

Once you have a 3D printer, you'll need something to actually print with it. While most consumer 3D printers come with a selection of model designs for you to print as test pieces, a printer doesn't come into its own until you've printed something for your own entertainment, enjoyment or use.

But unless you have a 3D scanner or a degree in computer arts, actually creating 3D models is a difficult process. So that you're not left completely adrift when your hardware is assembled, we've put together this guide to explain how you can make your own 3D-printable designs and where you can get designs that other people have made.

Model Marketplaces

The best place to look for 3D models is in dedicated marketplaces, where they've usually been vetted and community-tested, if not tested by the stores themselves. Many marketplaces also allow you to upload and sell designs you've created yourself.

MyMiniFactory

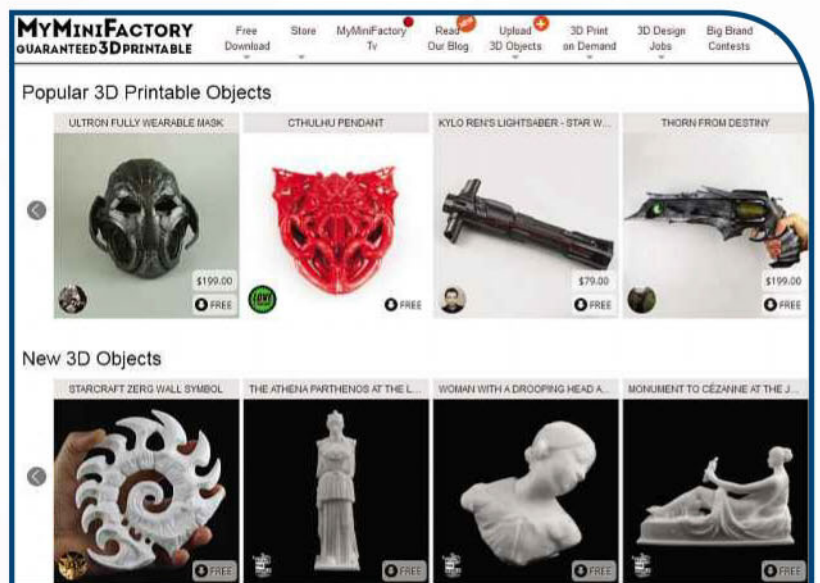
www.myminifactory.com

MyMiniFactory is a fully curated site, which means that all its designs have previously been tested on a genuine 3D printer to make sure they work, so there's effectively zero chance of you getting anything that doesn't work – as long as your 3D printer meets the minimum requirements for the design.

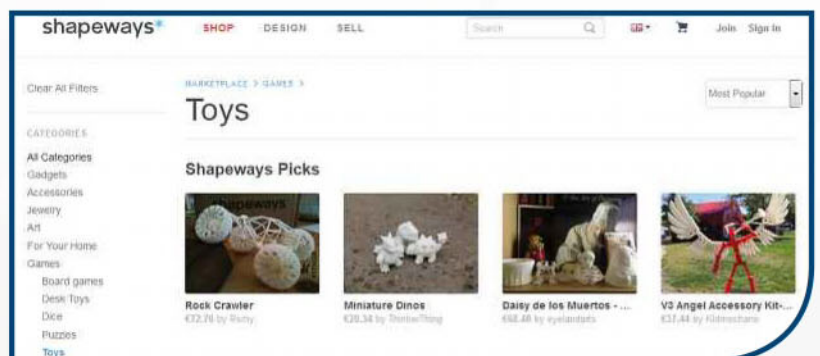
Launched in 2013, the site now contains a database of several hundred items at various costs, some of which are available to download for free. Most are fully open-source, meaning you're free to edit and even re-upload any free designs you download. The site is also one of the first to make strategic partnerships with manufacturers and companies, having formed links with Royal Mail and Cel Robox, which have integrated the library into their 3D printer software.

Although its library isn't the biggest, the curated nature of it does mean that all of the items are high-

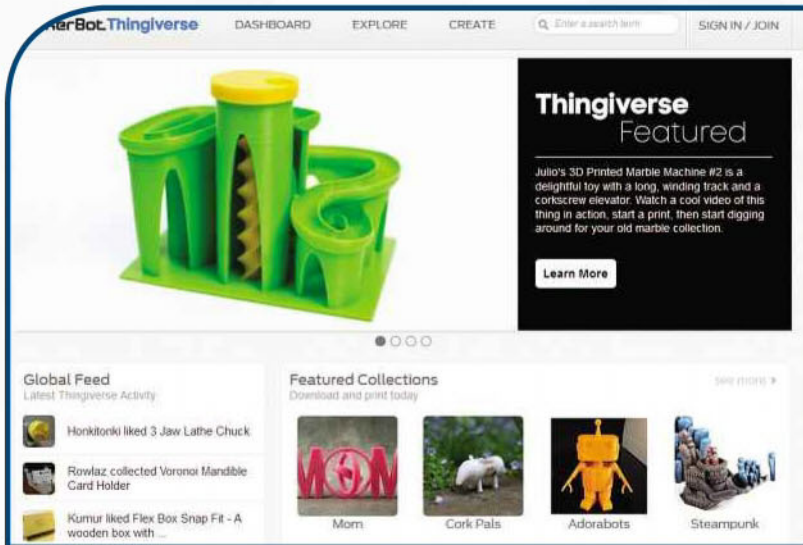
quality, and the considerable amount of free downloads makes it a good place for beginners. Whatever you download, you'll know that the only thing you're sacrificing is your time.



▲ MyMiniFactory



▲ Shapeways



▲ Thingiverse

While it's not much use for people who want to print their own 3D items, it's worth knowing about Shapeways if you're planning to make any designs yourself. A few good pieces and you might start to make a dent in the price of the printer itself! It's a great place to see what's possible with 3D printers, even if you haven't actually bought one yet!

Model Repositories

Distinguished from marketplaces simply because all their content is free, model repositories generally have a larger but slightly less high-quality selection of models. Errors are possible (if not necessarily common), and compatibility with certain devices might be less assured, but for the price, it's hard to complain.

Thingiverse

www.thingiverse.com

Set up by MakerBot, a company that produces its own popular range of 'Replicator' 3D printers, Thingiverse has a large range of free downloadable items, with the best grouped into featured collections. An Android app allows users to converse with other enthusiasts, which is a feature you won't find in many, if any, other repositories, and the site has a built-in customiser, so registered users can modify designs before they're downloaded.

Although it's run by MakerBot, the designs aren't proprietary in any way and can be used with any compatible 3D printer. Indeed, the site itself is almost totally free of MakerBot branding, so it's clear that it's a community venture rather than one aimed at existing MakerBot customers.

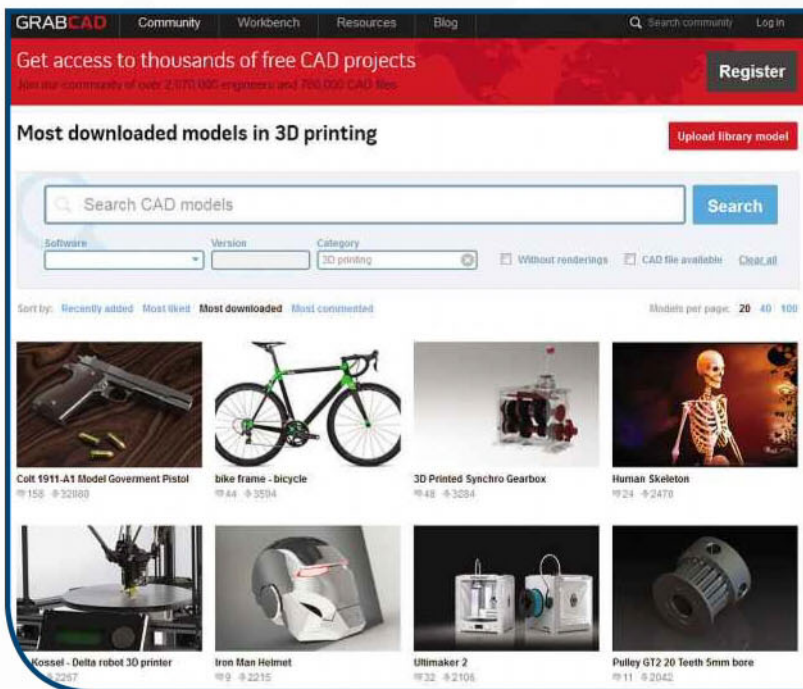
As with all repositories, it's possible to upload your designs, as well as download other people's. There's no financial compensation for this (and Thingiverse makes no money out of distributing them), but you do retain copyright. Work is distributed under a creative commons licence, which essentially allows anyone who didn't create the design to use the designs non-commercially. With over 100,000 downloads available, it's definitely a strong place to start.

GrabCad

grabcad.com/library/category/3d-printing

GrabCad is an online repository for CAD designs of all types. Although it's not 3D-printing specific, the website has a section of its database devoted to 3D printer designs, which can be downloaded and used for free. It's a fully searchable database, with user comments to help you check the performance and practicality of the designs before you've wasted a drop of plastic trying to make them, and this also means that if you have trouble, there's at least some recourse for getting help – even if it's not immediate.

If you grow to use the site a lot and want to share your own designs, there's also a powerful user backend called the 'workbench', which allows you to manage any CAD files you're sharing, including viewing them, comparing 3D models of the designs, managing revisions and creating shared workspaces. There's also a desktop app that can communicate with the site's cloud



▲ GrabCad

Shapeways

www.shapeways.com

One of the leading 3D printing marketplaces, Shapeways allows you to buy user-created 3D models or upload and sell your own designs. It's a bit like Etsy, only it involves 3D printing.

The important thing to note is that Shapeways doesn't sell the designs, only the models themselves, printing them to order whenever a user purchases one. Models can be created in a variety of materials, from plastic to metal to ceramics, and it's even possible for users to edit the models using an online tool before they actually buy their goods. Shapeways' legitimacy is such that it's even partnered with Hasbro. Inc to sell user-created models of My Little Pony characters.

storage, so you aren't restricted to the web interface when managing your designs.

With features like this, GrabCad is probably slightly better-aimed at rising and established professionals, so it's maybe only of cursory interest to beginners. But at the same time, if you're hoping to use your 3D printer in that sort of context, it's a site you shouldn't ignore!

3D Modelling Software

If you want to create your own 3D designs from scratch, you'll need a 3D modelling package. There are plenty around, but it can be tough to tell the difference between high-end modelling packages that would intimidate even the best Pixar animators and basic, simple packages that a home 3D modeller needs. There are more available than we could ever cover in one article, but these are some of the best.

123D Design

www.123dapp.com

Created by Autodesk, the company responsible for the likes of industry-leading packages like AutoCAD, 123D Design is an ultra-simple 3D modelling package specifically designed for 3D printer enthusiasts. The software is completely free unless you intend to sell your designs commercially, in which case you have to pay a \$9.99 monthly subscription.

Features of the free version include unlimited access to basic 3D models, access to ten premium 3D models a month and unlimited online storage. Premium users, in addition to being given a commercial licence to models, are allowed unlimited access to premium models, given access to a 2D layout creation option and discounts on PCB orders.

As a package, it's simple to get to grips with, and it's designed with 3D printing beginners and hobbyists in mind, so you're unlikely to find yourself grappling to understand features you don't need. It may not be the most comprehensive 3D modelling suite around, but for home-based 3D printing, it's near perfect.

SketchUp

www.sketchup.com

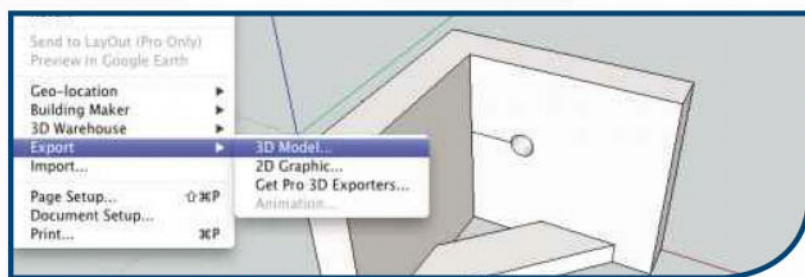
Most 3D rendering packages look and feel the same, but SketchUp takes a different approach. Rather than manipulate meshes and primitive solids, SketchUp allows you to draw and extrude shapes in any direction to create initially simple but increasingly complex 3D meshes in an intuitive manner. If you've never touched a piece of 3D rendering software before, SketchUp is the package for you.

One of the benefits of SketchUp is that it comes with literally millions of models that you can import and adapt into your 3D design project. The models are largely designed for 3D rendering purposes, so a lot of them are slightly too complicated or detailed for you to pass them directly through to your 3D printer, but they're easy to edit and make a fine base for your own models.

In most cases, all you need to do to get SketchUp working with your 3D printer is download an open-



▲ 123D Design



▲ Sketchup

3MF Format

Although most 3D printer designs are either provided in or converted into the STL format before they're actually sent to your printer, there's no particular reason this has to be the case. It's simply a convenience that has turned into a convention. This very month, Microsoft has sought to challenge that convention by announcing, along with seven other companies, the birth of the 3MF Consortium at the Build Conference 2015.

As well as Microsoft, the members of the 3MF Consortium are Dassault Systèmes, netfabb, HP, Shapeways, SLM Solutions Group and Autodesk – many of whom you'll recognise from elsewhere in this article. The goal of the consortium is to create and formalise a new 3D Manufacturing Format (3MF) file specification, which will allow design applications to send full-fidelity 3D model designs to other applications, platforms, services and printers with greater flexibility than the current STL format allows.

Part of the problem with current formats is their age. STL was designed in 1989, and there are many problems with interoperability and functionality. Some applications treat the format differently from others, while the format lacks elements that 3D fabrication software and hardware would find it useful to be included. Colour and material specifications are notably absent, as is specific information about how additive creation should proceed. If the 3MF format catches on, it'll make it easier for all printers to use the same files and produce the same items in the same way.

The first draft is available now under an open-source agreement, and it's already announced that Printbot's new Metal Simple 3D printer will be the first to use it to enable plug-and-play 3D printing in Windows.



The Microsoft Refurbisher Training event you cannot afford to miss!

Tuesday 19th May 2015 | 10:00am - 3:30pm

The Mancunian Suite, Etihad Stadium, Manchester

Microsoft refurbisher programs have over 5500 partners in 80 countries that ship millions refurbished PCs a year. We have joined forces with Microsoft and partner vendors to develop an event that is designed to increase your profitability and expand your knowledge of Microsoft's device and services strategy.

Why do I need to attend?

- Spend time with experts from Microsoft and learn from their direct experience within the Refurbisher arena
- Network with fellow Refurbishers and discover 'best practice' strategies to make your business soar
- Interact with a selection of attach partner brands and find out how they can enhance your offering
- Learn more about how Microsoft helps Refurbishers add value to refurbished PCs to increase profitability
- FREE to register and attend

Visit www.entalive.com to register now

Headline Partner



Showcase Partners



source STL plug-in so it can output designs in the right format. If you can make it that far, everything else should be easy.

STL Tools

The most common file format for 3D printing is STL, which was originally specified by 3D Systems for its Stereolithography CAD software. It's used across multiple software packages for design and prototyping, but crucially for us it's the most common format supported by 3D printers whether they were built by 3D Systems or not. Having software that can convert and read STL files is necessary for any 3D printer user, and that's why we've picked out a couple of essentials.

MeshLab

meshlab.sourceforge.net

In the website's own words, "MeshLab is an open source, portable and extensible system for the processing and editing of unstructured 3D triangular meshes", which means, in practice, that it's mostly intended as a tool for cleaning up the designs created by 3D scanners. Its feature set includes tools for editing, cleaning, healing, inspecting and converting meshes in the STL format, and while it's powerful, it's not quite a full 3D rendering suite: this program is designed purely for manipulating designs that are destined to be printed.

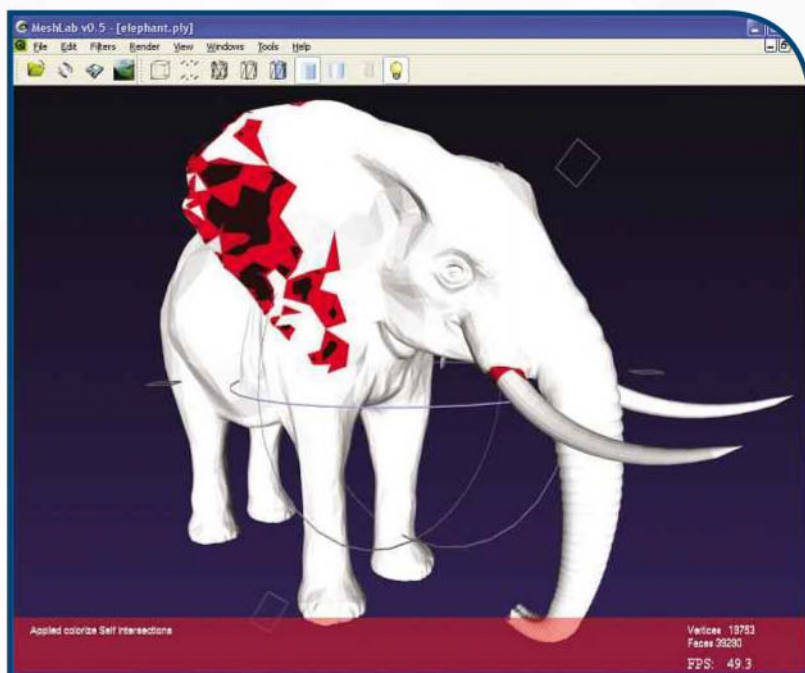
Although MeshLab is usable if you're a novice, it's definitely aimed at those with a more thorough understanding of the format and its uses, so don't be surprised if it seems a little daunting at first. The good news is that it's free to use and contains a website with thorough documentation, so the only thing you have to spend on it is your time. Versions exist for every major OS, from Windows, Linux and Mac OS X to iOS and Android, so there's no excuse for not giving it a try!

Netfabb Basic

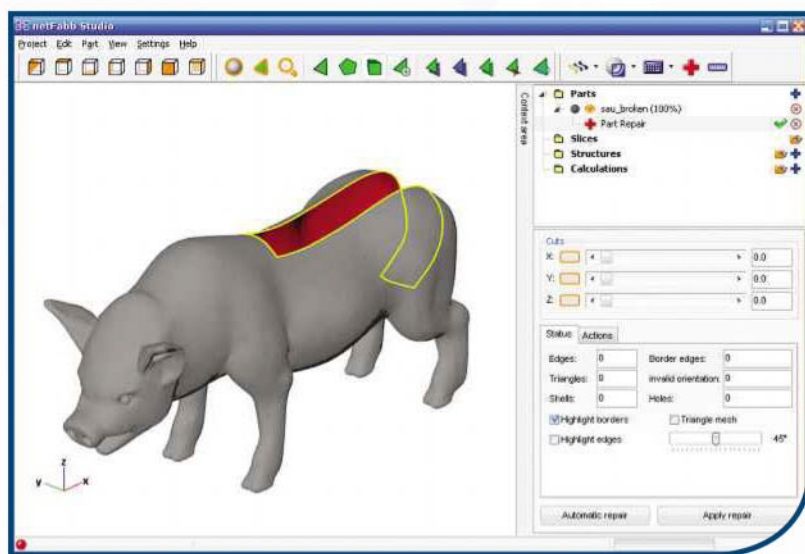
www.netfabb.com/stl_repair_fixing.php

A little like a simpler version of MeshLab, Netfabb Basic is an STL mesh viewer that includes an automatic repair function, making it ideal for those inexperienced with 3D modelling. The software is a reduced version of the company's commercially sold Netfabb Professional software package, but it's available for free on Windows, Linux and Mac OS X.

Although the basic version lacks many of the more advanced features, such as editing, file reduction and mesh refinement, it retains the already-mentioned auto-repair function as standard. The only problem with hitching your wagon to Netfabb early on is that the full version is considerably more expensive than you're probably expecting. Let's put it this way: it doesn't list a price on the website, and as the saying goes, if you have to ask, then you can't afford it. It costs thousands of dollars, so the average home user will never get the chance to go beyond Netfabb basic even if they wanted to.



▲ MeshLab



▲ Netfabb

But at the same time, that really shows you the level of service offered by Netfabb Basic. If you want professional-grade tools that can work for even the first-time user, this is one way you can do that.

By this point we should have pointed you in the direction of everything you need to bridge the gap between setting up your first 3D printer and getting your first personally designed objects out of your imagination and into the physical realm. Whether you're using existing designs, modifying them for your personal needs or trying to create something from scratch, you're now ready to take your 3D printer for a proper spin. Just remember to share what you create – one day, someone else will be in the position you were in. How cool would it be if the first thing they printed was something you made? [mm](#)

SET YOUR GAMING WORLD ON FIRE

**Buy Now,
Pay April 2016.**

Pay 10% of your order, and pay the rest off within 12 months and pay **no interest!**
Terms and conditions apply.

GET UNLIMITED PERFORMANCE WITH THE RIGHT PC



Elite Inspire GT

System Specifications

- Intel® Core™ i3 4160 Dual Core Processor
- MSI H81M - P33 Motherboard
- 2GB NVIDIA **GeForce GT740**
- 8GB DDR3 1866MHz Memory
- 1TB SATA III - 6GB/s 7200rpm HDD
- IN Win GT1 Mid Tower Performance Case
- Microsoft Windows® 8.1
- **Lifetime Gold Warranty***
- Plus many additional features, full spec online

£499

Inc. VAT & Delivery



Elite GTX 960

System Specifications

- Intel® Core™ i7 4790 Quad Core Processor
- MSI B85M - E45 Motherboard
- 2GB NVIDIA **GTX 960 Gaming**
- 8GB DDR3 1866MHz Memory
- 1TB SATA III - 6GB/s 7200rpm HDD
- Corsair Carbide SPEC-01 Gaming Case
- Microsoft Windows® 8.1
- **Lifetime Gold Warranty***
- Plus many additional features, full spec online

£799

Inc. VAT & Delivery



*Offer
of the
Month*

Slayer Xtreme Pro

System Specifications

- Intel® Core™ i7 5820K Six Core Processor
- MSI X99S SLI Plus Motherboard
- 4GB NVIDIA **GTX 970 Gaming**
- 16GB Quad Channel DDR4 2133MHz Memory
- 2TB SATA III - 6GB/s 7200rpm HDD
- Corsair Graphite 780T Full Tower PC Case
- Microsoft Windows® 8.1
- **Lifetime Gold Warranty***
- Plus many additional features, full spec online

£1299

Inc. VAT & Delivery

www.meshcomputers.com | [@meshcomputers](https://twitter.com/meshcomputers) | 020 8955 0731

Please Read: Sales subject to terms & conditions (copy available on our website). Advert does not form part of a contract. Pictures shown for illustration purposes only - colours may vary. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and other countries. All trademarks are acknowledged. At Mesh our PCs are Custom Built, Fully Burn-tested with Professional CPU Overclocking options - Free Overclock Configuration is available for a unlocked CPU and when a Liquid CPU Cooler is selected. *Lifetime Gold Warranty - Lifetime Labour, 2 Year Parts, 1 Year Free Collect & Return. Sales line open Monday - Friday 9am - 6pm. Online ordering 24x7. Prices and specification correct at time of going to press on 25/2/15. E&OE. Image - Battlefield Hardline 2015, Visceral Games and Electronic Arts.



mesh
British built award winning PCs • since 1987



Are Crowdfunded 3D Printers A Success?

They've certainly made headlines, but having a high profile doesn't necessarily translate into real-world success...

The DIY ethic inherent in 3D printing has had a notable effect on the industry sector in many ways, but perhaps the most surprising is in the number of 3D printers that have been brought to life using platforms like Kickstarter.

Part of the reason is that for many people, assembling a 3D printer is a hurdle they can't quite clear. They want to make 3D objects, but assembling a piece of computer hardware essentially from scratch is slightly out of their capabilities and price range. Even more enthusiastic 3D printing users get excited about the prospect of a unit built by and for enthusiasts, with features most consumer models cut corners on.

But crowdfunding projects are notoriously ambitious and optimistic, especially when it comes to computer hardware. They're often run by people who have unrealistic expectations about material costs, supply chain delays and production quality. Delivery

delays are common. So if the dream is a cheap, high-quality 3D printer that can be enjoyed by beginners and enthusiasts, how does the reality hold up? We looked at three high-profile 3D printing projects launched before 2014 to find out whether or not you're likely to get the 3D printer you asked for through Kickstarter.

Deltaprinter kck.st/1nL6UVG

The Deltaprinter's campaign launched in December 2013 and planned to deliver its assembled units in July 2014. Pledging to be "simple, efficient and affordable" it used polar rather than traditional Cartesian movement, intended to keep the unit compact and uncomplicated. The cheapest amount backers could pay to receive a unit was \$425 (£280) plus shipping, though it came unassembled. To receive a completed one, you had to pay at least \$625 (£409)

plus shipping. 691 backers pledged \$236,451, giving the company 121% of its \$195,000 goal.

The printer itself, it was claimed, would offer faster speeds than more conventional printers, a 100 micron resolution, automatic calibration and a compact power supply. Although many of its updates are backer-only, making it hard to find out the specifics of its production delays, it's clear that the project missed its target. In October, several backers were asking for refunds due to lack of information, but Deltaprinter was still actively responding to concerns with updates.

The units eventually began to ship in January, though there was minor controversy about the company shipping website orders before Kickstarter orders (though this is standard practice to prevent Paypal freezing accounts for non-delivery). As of 1st May, the company claims that all units should have been shipped that week – though missing parts in the self-assembly kits are a problem according to many commenters.

Unfortunately, there don't appear to be any reviews of the printer itself, but its Facebook page does show images of items printed by backers, so it seems that it at least works. All things considered, a six-month delay isn't bad for Kickstarter, and at this price it's hard to complain too much.

Verdict: Success

The Buccaneer 3D Printer kck.st/N7ezA6

Launched in May 2013, the Buccaneer 3D Printer was designed to bring 3D printing into everyone's home, promising a high-quality and affordable unit that anyone could use. It blew past its original target of \$100,000, and when it ended in June 2013 it had received \$1.4 million from 3,520 backers, who could get units for as little as \$297 (£195) plus shipping, with a projected delivery date of February 2014 – though



Deltaprinter

some batches were projected to arrive as late as April 2014.

In the campaign, the Buccaneer compared its technical capabilities to the popular Makerbot Replicator 2 printer (which cost the equivalent of £1,400) to highlight its capabilities. The Buccaneer added cloud printing and mobile compatibility, and although it produced smaller items overall, it was made of metal rather than plastic.

Again, updates were restricted to backers but an initial batch of printers was with users by March 2014, although apparently only those who chose to receive the untested prototype version. In July 2014, it issued a public update revealing that it had been forced to alter the product to contain a cold rather than heated print bed (the original producing better quality printing) but that backers could either take a cold bed device, wait until April 2015 for a hot bed device, or receive a refund, which would be issued by December 2014.

By March 2015, it was apologising for delays issuing the refunds and reassuring users that bugs in the controlling software had been fixed. While some people have received their printers, it's clear from the project's comments that many haven't, and even those that have are reporting problems, from software bugs to cracked casing. All things considered, it seems it's fallen short of its promises.

Verdict: Failure

FORM 1 kck.st/1g7TTCz

The FORM 1 project began in September 2012, offering (what else?) a high-resolution, affordable 3D printer. It hit its \$100,000



FORM 1

target in literally a matter of hours. When the project closed a month later, 2,068 backers had pledged almost \$3 million to the project. The FORM 1 was certainly in a different price league to the other projects we've looked at, and the cheapest way to get a unit was to pay \$2,229 (£1,460) for a first-line production unit. Deliveries were scheduled to begin in February 2013, and the latest units – those for international backers – were due to arrive in April 2013.

The project's aim was to deliver a professional-quality printer at a cost that home users could afford, at a time when those printers cost tens of thousands of dollars and consumer models were considerably more simplistic. It promised 300 micron accuracy, which it's worth noting is 200 microns worse

than the other two projects in this list (which both started in 2013).

The project's updates are mostly public, so it's easy to follow the progress of the design and shipping. The project received a setback in November 2012 when Formlabs, which ran the project, received a patent infringement lawsuit from 3D Systems, though it continued to make units throughout the duration. The first units began to ship in May 2013, though it did not complete USA and Canada production until September 2013, and the project was not announced as complete until December 2013.

But again, the delay wasn't too bad, and the units seem to have been largely well received by backers, and reviews were good. The company followed up with a conventionally funded upgrade, the Form1+, and a documentary covering its start-up period, entitled 'Print the Legend', is available on streaming services.

Verdict: Success

While it's clear that all projects suffered delays, this is fairly standard for crowdfunding projects in general. Of greater concern is the quality of the product you actually receive, and in that case it's more or less worked out. Of the three high-profile projects that have had adequate time to run their course, only one has combined huge delays with inconsistent product.

While neither of the other projects were perfect, they did at least deliver what they promised in a reasonable amount of time. The odds aren't ideal, but if you want to save money, then it seems like Kickstarter is a good place to go for 3D printers – as long as you don't mind waiting a little. **mm**



The Buccaneer 3D Printer

3D Printing Outside The Home



It's not just a revolution for home-based makers, you know!

Although 3D printing's current popularity stems from its growing success as a home technology, there are applications outside the home (and office) that make it increasingly clear that we've only scratched the surface of what 3D printing might be able to do. While consumer 3D printers tend to create small and relatively simple objects, the principles they're based on are radically transforming other industries. If you aren't convinced that 3D printing is the future, maybe you'll change your mind once you've read this.

Medical Applications

The medical industry has a number of uses for 3D printing which are already in active development, if not regular use today. The field of prosthetics has had immediate benefits from the technology as it allows the creation of limbs and joints specially shaped to fit the recipient's body topology. The time to create prosthesis of any kind is also massively reduced by 3D printing – essentially making it an in-house task. It's also becoming popular for surgeons to create 3D models of body parts using scans of a patient so that they can practise operations before they perform them.

In many cases 3D printing doesn't allow anything new to happen – it simply streamlines and simplifies existing procedures. For example, the Invisalign dental treatment uses 3D scans and 3D printing to create clear plastic braces that fit over patients' teeth to gradually move them into place without the need for metal fixtures; 3D printing didn't make this possible, but it did make it a commercially viable technique.

3D printing has even made the leap to printing biological tissue. Devices called 'Bioprinters' can dispense so-called 'pretissue' cells in a similar manner to a 3D printer dispensing plastic. This pretissue creates a biological framework that can be used as a scaffold for regenerative bone and skin growth or, in some cases, aid the growth of artificial organs. The technology is still in its earliest days, but it's not inconceivable that one day a combination of 3D printing and cell-cloning techniques will mean transplants and grafts will take place using 3D-printed organs created using patients' own cells.

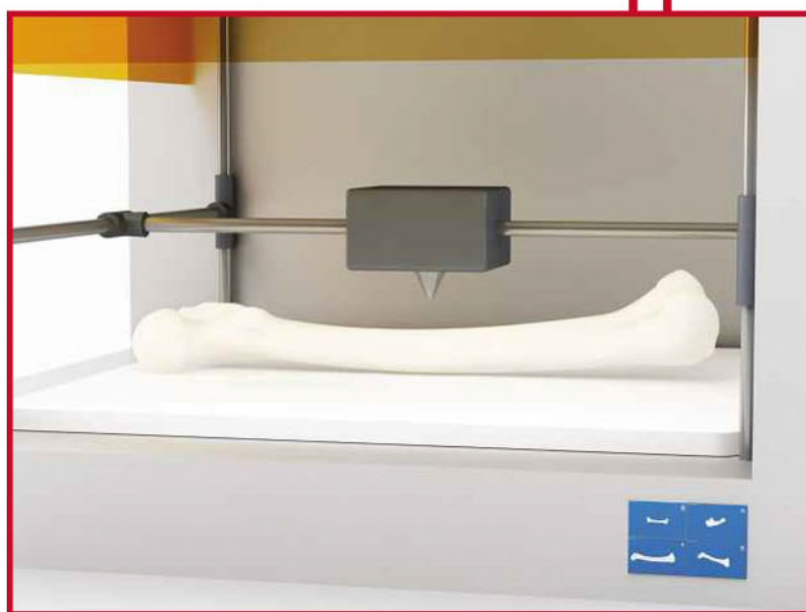
At present, the technical hurdles to creating 3D-printed organs are, admittedly, large – for a start the organs lack cardiovascular systems, so the interior cells

are starved of oxygen and die – but not so large as to be insurmountable. Researchers have 3D-printed proof-of-concept cell structures containing a vascular system that keeps it alive, so in effect the final step is combining the two. If this can be achieved it would have a significant effect on mortality – both directly, in terms of saving lives, and by making drug testing and research more efficient and accurate through the use of human tissue.

Buildings

3D printing in the construction industry occurs at many levels, from concept to realisation. There's almost no part of the process which isn't able to benefit in some way from the technology. For example, the concept stage of building is being significantly streamlined by 3D printing. In the past, architects were required to produce tens, maybe hundreds of renderings to demonstrate how a building would look once complete. Models could be created, but they were time-consuming and expensive.

Computer Aided Design means it's possible to 3D print scale replicas of everything from a building exterior to its individual internal features, so that clients can get a perfect view of the concept before a brick has





HP Elitebook 8440p
Intel i5 2.4GHz
4GB DDR3 RAM
Webcam
Windows 7 Pro Installed
1 Year Warranty
250GB Hard Drive
(New SSD from £45 + VAT)

£225 + VAT



Dell Optiplex 755 SFF
Intel Core 2 Duo 2.33GHz
2GB DDR2 RAM
Windows 7 Pro Installed
1 Year Warranty
160GB Hard Drive
(New SSD from £45 + VAT)

£110 + VAT



Dell Optiplex 790 SFF
Intel i5 3.33GHz
4GB DDR3 RAM
Windows 7 Pro Installed
2 Year Warranty
250GB Hard Drive
(New SSD from £45 + VAT)

£240 + VAT

Microsoft
REGISTERED
Refurbisher

**micro
mart**

**Now There Are More Ways Than Ever
To Read Your Favourite Magazine!**



Download the Micro Mart iOS App
tinyurl.com/MicroMartiTunes

**Buy or subscribe using Zinio
on your tablet, mobile phone or PC**
tinyurl.com/MicroMartZinio

Read Micro Mart on Magzter
tinyurl.com/MicroMartMagzter

or you can follow us...

@Micro_Mart
www.facebook.com/micro.mart.mag

ever been placed. Indeed, it has been reported that 3D printed models are sturdier and lighter than previous technologies, and 3D printing has reduced the time from concept to model by 50-80%.

On an altogether larger scale, the creation of simple, slot-together houses and buildings is being aided by 3D printing, which makes it easy for manufacturers to create compatible joints and fittings across multiple parts, ultimately reducing the amount of precision working required to assemble houses. If that sounds futuristic, at least one person – Dr. Behrokh Khoshnevis, as part of his research at the University of Southern California – has tried to create a 3D printer capable of printing an entire house.

Khoshnevis' system uses a process known as 'Contour Crafting', which is an additive manufacturing technique that deposits layers of materials (such as concrete) into set patterns. In theory, conductive and insulating material could also be laid down by the printer so that houses have plumbing and even electrics built-in from the very start.

Consumer Manufacturing

Although 3D printing has the potential to cause profound changes within some industries, it's likely that the most rapid uptake will be in areas where the possibilities are more pedestrian and therefore easier to adopt as part of an existing commercial framework. Product manufacturers, for example, are increasingly abandoning traditional methods in favour of 3D printing. As strange as it might sound, 3D-printed clothing is already a reality. Everything from dresses to shoes have been produced as proof-of-concept pieces, and in a commercial context Nike has used 3D printing to create custom-fit shoes for athletes.

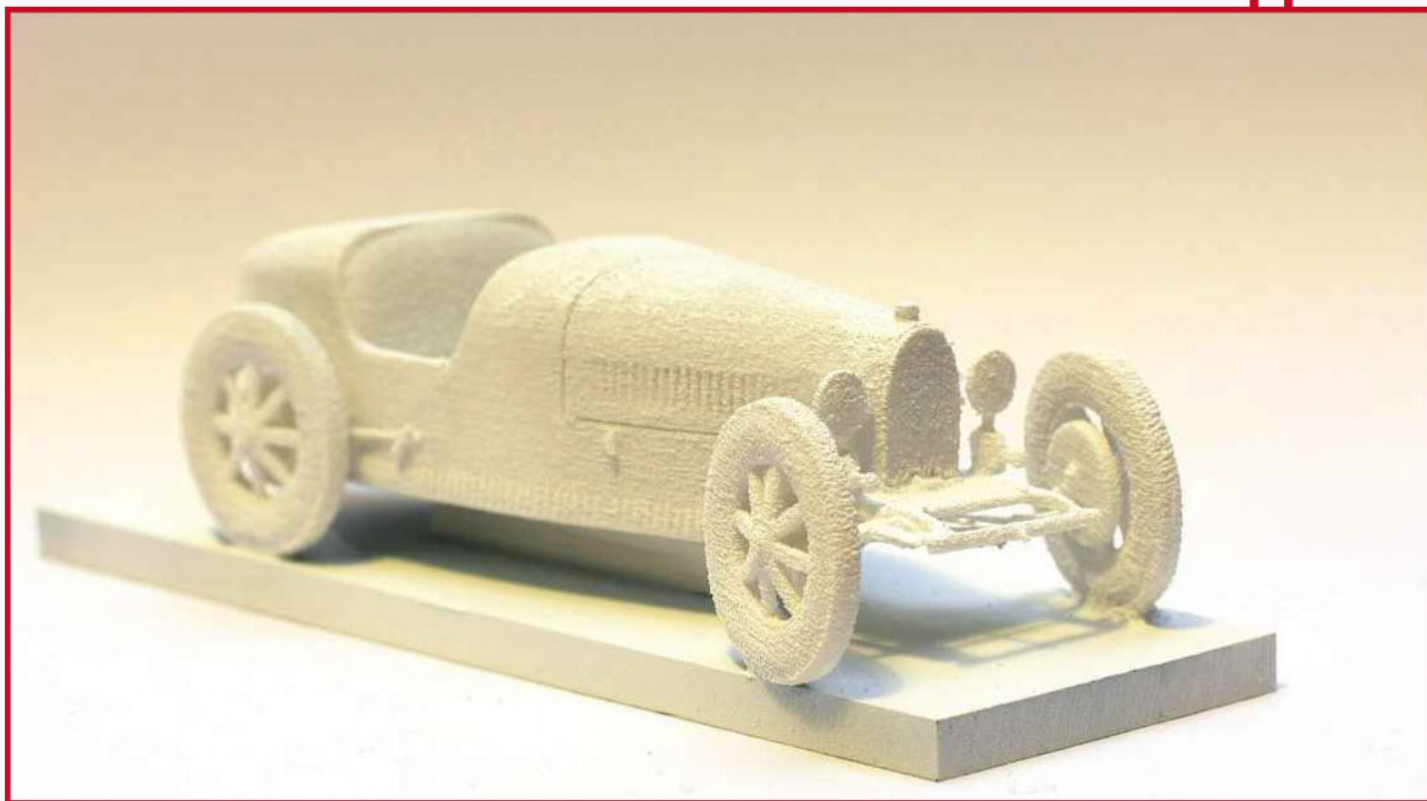
Custom Eyewear is also a popular area of expansion, with 3D printing used to create rapid prototype frames. These can then be properly manufactured with lenses fitted once the customer is happy with a specific design.

In car manufacturing, the possibility of 3D printed parts has already become a reality. At present it tends to be at the high end of the market – Swedish manufacturer Koenigsegg, for example, touted the fact that its One:1 supercar used a significant number of 3D printed parts. 3D printed hardware is likely to become more and more common in cars, though, as it allows for greater intricacy, smaller manufacturing runs, lighter components and easier replacement of damaged components. Indeed, if you need a part replaced, a mechanic might be able to download the original designs and print a replacement for you.

In September 2014, US company Local Motors proved that 3D printing wasn't just for less traditional parts when it demonstrated large-scale additive manufacturing processes that used fiber-reinforced thermoplastic to 3D print an entire car body. Eventually the company plans to 3D print an entire car to demonstrate the depth of possibilities 3D printing offers the automotive industry.

And The Rest!

It's almost impossible to go into full detail about the range of things that can or will benefit from the introduction of 3D printing. RAF jets have flown using 3D-printed parts, and in 2013 a pop-up shop created 3D-printed vinyl records to sell to the public on record store day. If that doesn't adequately demonstrate how 3D printing has the potential to travel the length and breadth of culture, then nothing will. **mm**



TP-LINK®

Networking Provider of Choice for Team Dignitas
International eSports Professionals



UNLEASH YOUR INTERNET WITH WIRELESS AC SO YOU CAN DO MORE, FASTER

ROUTERS • POWERLINES • RANGE EXTENDERS



team-dignitas

One of the World's Leading eSport Teams.



TP-LINK®
The Reliable Choice

uk.tp-link.com

[/tplinkuk](https://www.facebook.com/tplinkuk)

[/tplinkgaming](https://twitter.com/tplinkgaming)

amazon.com

dabs.com

ebuyer.com
technology delivered

[OVERCLOCKERS UK](http://overclockers.uk)

[SCAN](http://scan.co.uk)

The Future Of 3D Printing

Where next for this developing technology?

3D printing is undeniably one of the more successful technologies to emerge in the last few years, having only recently become commercially viable. But at present, 3D printing is in its infancy. The vast majority of us have never touched a 3D printer or anything made by one. So is this a fad that will disappear once everyone who wants to try one has had a go, or are there big things in store? What, if anything, is the future of 3D printing?

Current Technology

It's widely accepted that 3D printing is going to have a truly revolutionary impact in the manufacturing and medical sectors, where rapid prototypes will allow for quick innovation, and 3D printed bones and organs will make creating bespoke treatments as simple as clicking a button. But as optimistic and exciting as that is, it isn't going to have a huge impact on most people's daily lives. We're interested in what will.

If you own a 3D printer, there are obvious applications for it that might make life simpler. If a piece of plastic breaks on something that's either expensive or irritating to replace (a part inside your vacuum cleaner or the battery cover on your TV remote control, for instance), you could just scan the pieces in 3D, fuse them digitally and print yourself the part you need. This is the dream of 3D printing. It's wasteful to throw out something large because a small piece of it breaks, but it's also uneconomical for companies to sell small parts individually.



But that future relies on a number of things happening: first you have to buy a 3D printer, then you have to buy the materials to print with, and then you need a 3D scanner (or the item schematics) available and software that allows you to easily manipulate the items you want to create. You'll have to print a lot of battery covers to recoup the cost of a full 3D printer in salvaged remote controls.

The price of 3D printers and their materials is, of course, dropping as economies of scale kick in and drag the technology out of the rarefied air of the enthusiast sector. But are they dropping enough? And if not, what's the alternative? If 3D printing can't be the same as it is now but cheaper, what might it be instead?

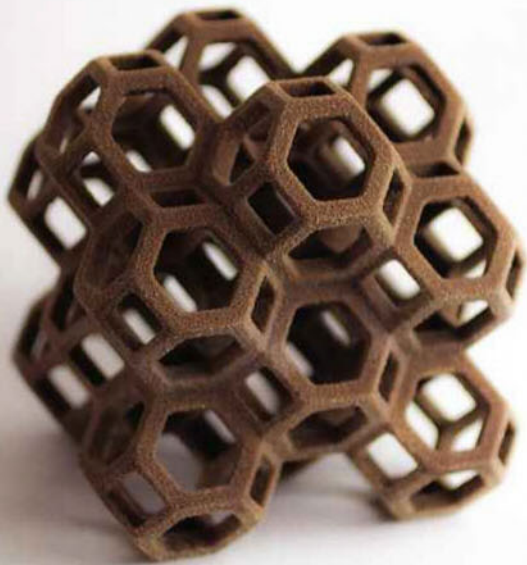
CES 2015

If you want to see what the future of consumer electronics looks like, there's only one place to get that information: the Consumer Electronics Show. Held every January,

the CES show brings together electronics manufacturers from every market sector to demonstrate their next big thing alongside proof-of-concepts and experimental prototypes. If you don't see it here, it probably won't exist any time soon. And if you do, it probably will.

The original 3Doodler – a 3D pen – was a hit on Kickstarter, having proven its capabilities and viability as a commercial model. The 3Doodler 2 was a similar hit at CES 2015. A quarter as large as the original and half the weight, the 3Doodler is perfect for making everything from 3D wireframes to simple 2D decoration. It's debatable whether it'll ever become essential in the home, but if the maker can keep refining and improving it, 3D pens such as the 3Doodler are sure to become far more common in the coming years.

But that's not really a 3D printer in the conventional sense, so what about the standard idea of a desktop-bound box?



Budget 3D printing is certainly becoming a big industry. Everyone from MakerBot to Ultimaker to XYZprinting debuted their cheapest 3D printers ever, which should allow more casual interest in the form to be acted on. The 'da Vinci Junior' costs just \$349 and has a build size of 5.9" cubed, weighs just over 11kg and can print from an SD card. The future of wireless printing, unsurprisingly, is affordability.

Elsewhere, Airwolf 3D introduced the AW3D HD-R, which is a wi-fi capable printer that can be controlled over the internet or from a smartphone app. Its build volume of 11" x 8" x 12" is pretty big, and it comes with a built-in camera so you can remotely monitor items as they're being produced. Airwolf 3D clearly believes that wireless

is a feature all 3D printers should have, because it also introduced an upgrade kit so users could add functionality to their existing Airwolf machines.

And finally, Voxel8 has found its own direction to take 3D printers in by producing a device that can 3D-print electronics by using a conductive silver ink to create circuitry within 3D items. The idea is in its infancy, but it's not outside the realms of possibility to imagine that you might one day be able to create your own computer components by printing off the base and simply inserting the required chips and components. Proper DIY stuff.

Beyond Plastic

While 3D printing seems like a neat way to make small models and

replacement bits, that's not the only thing manufacturers are thinking of. Getting away from the standard idea of 3D printing, there are companies that are making 3D printers that don't use plastic as their sculpting materials at all.

For example, XYZprinting's Food Printer uses three different food pasts to create sweet or savoury items that can be printed into any 3D shape and then cooked and eaten like normal food. Similarly, the 3D Systems CocoJet can 3D print chocolate. At the moment, the technology is simplistic, but it's not just designed to make Charlton Heston drool; it could also change the way you cook at home. A kitchen with a 3D printer rather than a microwave might yet happen.

And once you take the idea of 3D printing food to its logical conclusion, the possibilities seem endless. Imagine 3D printing a sandwich with its own filling or a pizza with its own topping or an edible replica of the Eiffel Tower, if that's what you prefer. In theory, you could print nutritionally complete food so everything you eat has the right nutrients or combine the technology with a built-in oven or microwave, so it's ready to eat from the moment you remove it from the printer. If that's not futuristic, what is?

Last but not least, the Welder 3D printer promises to make emergency trips to the hardware shop to buy a particular-sized washer or screw a thing of the past. Created by students of the Delft University of Technology, the Welder prototype cost £650,000 to make but uses a combination of a welder and 3D printing parts to create metal items in a way that doesn't involve poisonous fumes and industrial-grade lasers, like its industrial equivalents do. It's still going to be a long time until you can stick one of these in your garage, but the technology could exist sooner than you think.

Of course, none of this guarantees that 3D printing will definitely stick with us, but with over 20 different commercial models already on the market, it's clear that the commercial will for it to stick around is there. Maybe it's time to become an early adopter? [mm](#)

SUBSCRIBE NOW!



Subscribe to **micro mart** today and save on the single issue price.

Each issue of *Micro Mart* will be delivered directly to your device each week.

SEE NEXT PAGE FOR SET-UP INSTRUCTIONS

HOW TO SUBSCRIBE...

...on an iPad or iPhone

- STEP 1** Return to the *Micro Mart library*
- STEP 2** Choose your subscription term and tap twice on the 'price' box
- STEP 3** Choose whether to create an optional *PixelMags* account
- STEP 4** Enter your *Apple ID password* to confirm



...on a Kindle Fire

Kindle Fire subscriptions come with a **FREE** one month trial.

- STEP 1** Tap '**Free Trial Subscription**' in the *Micro Mart library*
- STEP 2** Chose your subscription term from the drop down menu on the popup that appears
- STEP 3** Tap '**Subscribe**'



...via the Zinio app

- STEP 1** Search for *Micro Mart* via the search box in the *Shop tab*
- STEP 2** Tap the '**Subscribe**' button
- STEP 3** Choose whether to create an optional *Zinio* account
- STEP 4** Enter your *Apple ID password* to confirm



Subscribe to *Micro Mart* today and save on the single issue price



100% Security For Lazy People

Keir Thomas explains in concise and simple terms how to implement just about every common-sense security measure

One thing all computer owners desire is security, but what 99% of computer owners lack is the time and effort to put in place the often complicated procedures – procedures that also demand you understand the complexities of what's involved.

If you're one of the 99%, then this feature is for you. Over the next four pages we tell you what to do to achieve maximum security and how to do it. We're not concerned with explaining anything beyond what you absolutely need to know.

We assume throughout that you're not a complete idiot and have already taken the basic security measures most of us have learned are necessary. We're not going to tell you to install anti-virus and adware apps, for example, or tell you to use longer rather than shorter passwords involving numbers and letters.

It's necessary to realise privacy and security are two separate entities. We're not interested here in stopping Google track which sites you visit, for example, but we are interested in – among other things – ensuring your everyday web browsing can't be snooped on in transmit and stopping malicious interests accessing your files.

Secure Boot

We start our journey before the PC has even booted. Those PCs whose motherboards have UEFI firmware rather than a traditional BIOS are fundamentally more secure than those that don't, because UEFI offers Secure Boot. This locks the computer to the operating system and makes it impossible to install boot-time malware like rootkits.

Secure Boot has a bad rep, because it makes dual booting with Linux tricky (although not impossible), but if you only ever run Windows on your PC, then it really is a no brainer – and additional operating systems are perhaps better run as virtual machines nowadays anyway.

Alas, Secure Boot is only supported by Windows 8 and later, but if you bought an off-the-shelf computer running that version of Windows, then it's very likely already enabled. You'll need the 64-bit version, however, although this is pretty much de facto nowadays.

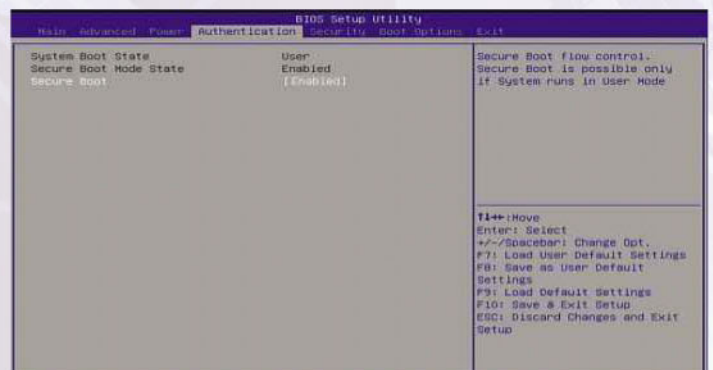
Windows 7 or XP aren't compatible with Secure Boot so our first piece of easy-peasy advice is to make the switch to Windows 8 and ensure that any computers you buy in future are running Windows 8 (or 10, when it arrives). Believe it or not, there are other benefits to Windows 8, such as better performance and other important security advances. Windows 7 is now nearly six years old. Resistance to new versions of Windows is understandable – perhaps even a tradition – but it can turn into idiocy when security issues are involved.

To Secure Boot, you'll need to create a fresh Windows installation rather than a simple upgrade from an older Windows release, and before doing so you'll need to delve into your firmware screen to ensure UEFI and Secure Boot are enabled (and if your computer is older, then it might not be compatible – check the spec list for mention of UEFI). Performing a motherboard firmware update is also a very good idea.

You'll need a UEFI-compatible installation media. The Windows 8 DVD-ROM is fine, but if you like to use a USB stick to install, then for tedious technical reasons it'll need to be formatted as FAT32, rather than NTFS, and use the GPT partitioning system. An app like Rufus (rufus.akeo.ie) will do the hard work for you. Note that a minority of computers can't handle a partition larger than 4GB on the USB stick.

Secure Login

Once a computer's booted, most of us usually need to type a password. What do you mean you boot straight to the desktop? Change that immediately! On Windows 7, tap Windows+R, and in the dialogue box that appears type 'control userpasswords2'. Then put a tick in the box that reads 'Users must enter a user name and password to use this



▲ *Secure Boot makes it impossible to install a rootkit on your PC, so enabling it is a good idea*

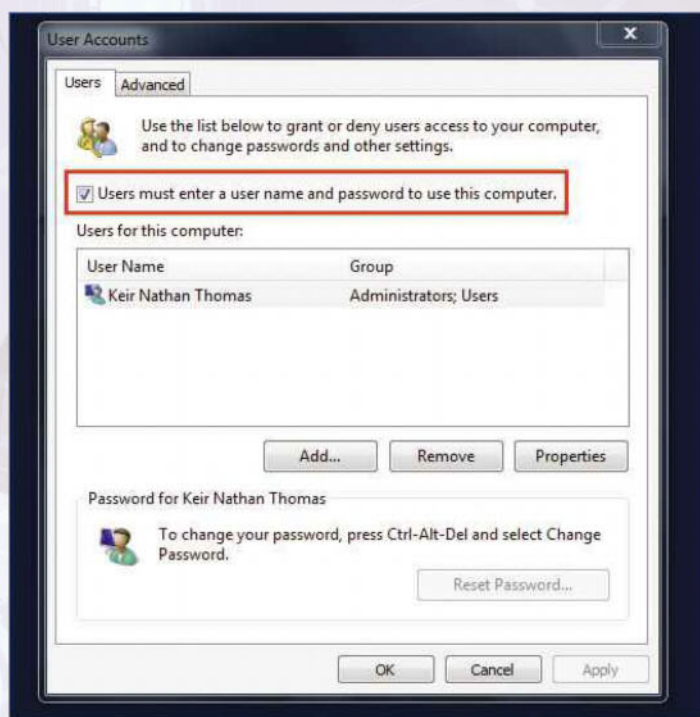
▼ *There are some surprising reasons to switch to Windows 8, but increased security is one of the most pressing*



computer'. On Windows 8, tap Windows+R and type 'netplwiz'. Then put a tick in the same box as mentioned previously.

One of the huge issues with automatic logon – aside from the fact it gives everybody who can boot the PC access to your stuff – is that it stores your password in a relatively unprotected form in the Windows registry. If you absolutely insist on automatic logon, then £17.95 will buy you LogonExpert (goo.gl/YbEmN5), which fixes this and encrypts your password.

Another solution for login issues is to forget about login passwords entirely and use a fingerprint scanner. A variety of models are available and can cost from as little as £12 – see the Neewer USB Biometric Fingerprint Reader (goo.gl/pD46Ke), for example. They typically connect via USB and either tie in with the built-in Windows Biometric Framework or replace it with their own software.



▲ **Deactivating automatic login is a must if you're serious about security**

▼ **The Yubikey is a USB authentication device that makes it impossible for people to log in with just a password**



A word of warning, however: fingerprint scanning is still an imperfect technology and prone to frustration. One of the few reliable technologies was produced by AuthenTec, which was snapped up by Apple and turned into TouchID for its iOS devices. Smartcard technology provides an alternative secure login method, wherein Windows login requires you insert a credit card-style card into a special keyboard or reader device (many are available – just search Amazon). Windows again already contains the built-in tools needed. However, smartcards are really designed for corporate use. They usually need to work in concert with a security certificate authority server, for example, and are therefore just too complex to implement for home use.

A simpler alternative to both fingerprint scanning and smartcards is to use a Yubikey (goo.gl/8YlZop), which costs around £25. This is a USB stick containing a two-factor code that you insert when logging in to provide additional verification in addition to your password. Nobody can log into your Windows account without it. A YubiKey is almost indestructible and can be kept on your keyring when not in use, and it can help protect other things too, such as password managers. Setup is a little involved but only needs to be done once, and you'll find instructions here: goo.gl/uj2Wkb.

File System Encryption

Encrypting the entire file system is a no-brainer when it comes to 100% security. It means that even if somebody removes the hard disk from your PC, they won't be able to access your files. If you're using the Ultimate or Enterprise versions of Windows 7, or the Pro or Enterprise editions of Windows 8/8.1, then everything you need is built in. It's called BitLocker, and it's essentially invisible in everyday use.

If you don't have the right edition of Windows, then consider upgrading – on Windows 7 open the Start menu and type 'anytime upgrade', then follow the prompts. With Windows 8, return to the main tiles screen and type 'Add features to Windows 8', then click the 1 Setting icon in the list of results.

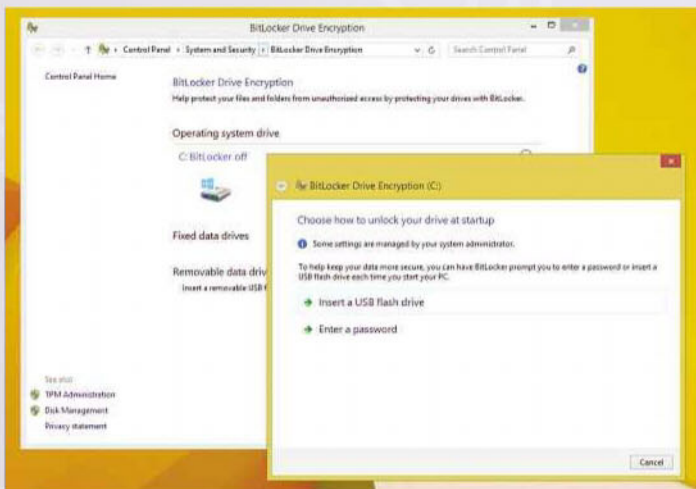
BitLocker works best if you have the Trusted Platform Module (TPM) as part of your motherboard chipset. There's an easy way to find out if this is the case for your PC, and that's to try to activate BitLocker. On Windows 7, this can be done by opening the Start menu and typing 'bitlocker' into the Search field and hitting Enter. On Windows 8, return to the tiles screen and type 'bitlocker'. Then click the 'Manage Bitlocker' entry in the list of results that appear.

Click the Turn On BitLocker link and, if you don't see an error message, then congratulations, you need do nothing more than follow the BitLocker setup wizard. Once the disk is encrypted and you've created the rescue key (that you MUST NOT lose!), you need not think about it any longer and can use Windows in the same way as you always have.

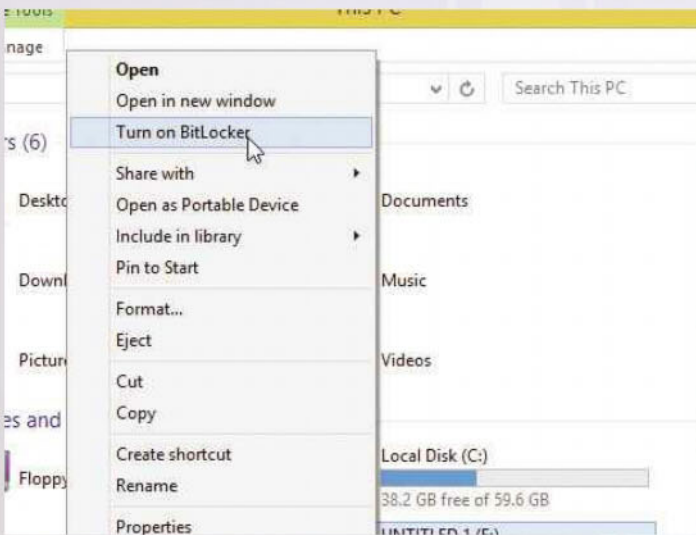
If you see a message to the effect that you don't have a TPM, then don't worry, you can still use BitLocker; setup is just a little more complicated.

To force BitLocker to work without a TPM, on either Windows 7 or 8/8.1, hit Windows+R and type 'gpedit.msc' into the Run dialogue box. On the left of the window that appears, navigate through to Computer Configuration > Administrative Templates > Windows Components > BitLocker Drive Encryption > Operating System Drives. On the right of the window, double-click 'Require additional authentication at startup'. In the new window that appears, click the Enabled radio button, and then click the Apply and OK buttons.

Repeat the step mentioned previously to install BitLocker. Once you reboot and log in again after the disk has been prepared on Windows 7, you'll be offered the choice of saving out the key to a USB stick, which will be required to boot the computer every time. Just follow the instructions. On Windows 8, you can save out the key to a USB stick or



▲ BitLocker encrypts the entire disk, making it impossible for anybody to access its files without first unlocking it
 ▼ Removable storage devices like USB sticks can be protected by BitLocker To Go, which works across both Windows 7 and 8/8.1



alternatively create a passphrase that will need to be entered each time you boot, in addition to your login password.

Encrypting other disks on your computer is simply a matter of opening Computer view in Explorer, then right-clicking the drive and selecting 'Turn on BitLocker' from the menu that appears. To encrypt removable storage devices such as a USB stick, start the BitLocker setup routine, and this time choose the BitLocker To Go option, then follow the instructions. Bear in mind that this will mean the data on the removable storage device is only accessible via Windows 7 and later computers.

Securing Apps

Windows 7 and later contain a surprising amount of security features, many of which work in concert with abilities built into the CPU. However, in typical Microsoft fashion they're often not enabled, because of compatibility worries.

Enhanced Mitigation Experience Toolkit (EMET; goo.gl/Tbamb7) is a free tool from Microsoft that allows you to automatically activate the maximum number of security features for the most popular third-party apps, such as Acrobat Reader, iTunes and Java. This is done with no input required from the user and has been tested to ensure nothing gets broken along the way.

You can also activate security features for built-in Windows apps, like Internet Explorer and Microsoft apps like Office. EMET is designed for

use by IT professionals to administer many PCs across a network, but it works equally well on stand-alone PCs and isn't hard to understand.

During app installation, select the Use Recommended Settings option. Then quit all open apps, and start the EMET GUI app, which you'll find on the Start menu. Click the Import button at the top left. You'll find three profiles listed. Select Popular Software. The changes settings take effect immediately, and you can quit the EMET GUI app. Nothing more needs to be done.

You can also attempt to add your own app to the list by clicking the Apps button on the toolbar, then Add Application. Then put a check alongside each of the boxes. Beware that some experimentation will probably be necessary.

Secure Online

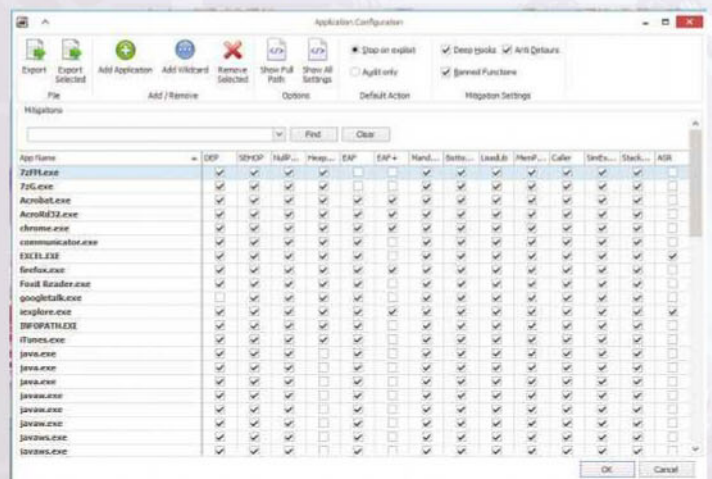
So far we've secured the physical PC against boot threats, secured the file system, secured the system login and secured apps. There's only one frontier left: online.

For historical reasons, most data is transmitted on the web in plain form, which means anybody can eavesdrop at any stage of transit. The exception is secure connections such as those made to banks, webmail services and online shopping sites. These use secure HTTP, and you can tell because the address starts with https://. (Okay, so in our post-Snowden world there's doubts even HTTPS is actually secure, but it's the best we have right now.)

Wouldn't it make sense if every site used HTTPS? Making a website secure is a bit more complicated and expensive than running a basic site, but nonetheless there is a slow revolution happening, and several sites are making the switch.

You could try adding an S to the middle of each web address – so that <http://example.com> becomes <https://example.com>. There's an https:// version of the Google home page, for example. However, an easier way is to install the HTTPS Everywhere browser extension (goo.gl/OZAHrs). This simply consults a database of sites that have an optional https:// entrance and switches you automatically should you try to access one. Because some sites implement only part of their data behind HTTPS, it can mean sites look a little incorrect, but this is rare, and usually the content you need is still accessible.

An additional option is to use the Tor browser (goo.gl/n65M2m), a version of the Mozilla Firefox browser that routes your data through an anonymous network of volunteer computers and servers in order to make snooping difficult to the point of impossible. However, useful though it is, Tor is not perfect, and a list of reasons for this are admitted openly by the project (goo.gl/sczxRN). For example, data is encrypted while it travels through the Tor network but not at the

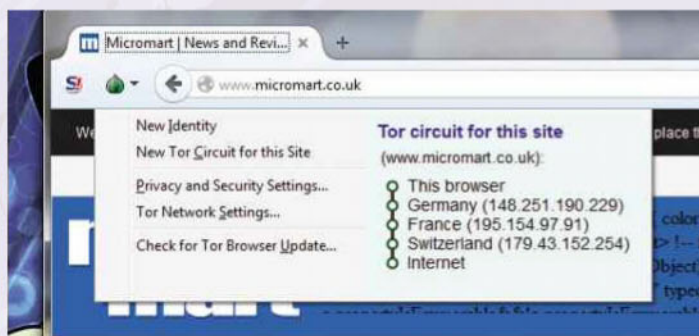


▲ Microsoft's confusingly named Enhanced Migration Experience Toolkit can secure apps using the latest CPU features



▲ **HTTPS Everywhere** automatically chooses secure connections to websites when you visit them

▼ **TOR Browser** lets you browse in a way that makes snooping on your data virtually impossible



random 'exit point', where it rejoins the main internet. In other words, Tor is not a replacement for HTTPS, which should still be used, and in fact Tor includes a built-in version of HTTPS Everywhere.

Tor can be a little slower than regular browsers. Additionally, because the exit point might be overseas, you may find that sites that block via geographical IP address don't work.

Email And Messaging

Email is a mishmash of encrypted and unencrypted communication protocols but in general should be considered as insecure as the web. Securing individual email messages so they can't be snooped in transit has for a long time been possible via GPG or proprietary solutions such as that built into Microsoft Outlook. These encrypt the message contents, and they typically require the recipient to have the same software installed and also have the correct decoding key. Alas, although fundamentally simple once you've grasped the concepts, this technology is often initially baffling even for those who consider themselves computer savvy. It's for this reason that encrypted email has never become mainstream, and we can't advocate it here. It's just too much trouble.

Instead, simple common sense can mitigate potential security problems. If you have to send a username and password to somebody, for example, then send them in separate messages. Additionally, use the POP3 email protocol rather than IMAP to avoid leaving messages on the server, where they're open to snooping.

Modern messaging systems like Apple's iMessage, Skype or WhatsApp are securely encrypted by default so are perhaps a better choice for transferring sensitive information. Incidentally, did you know



▲ There's no getting over the fact email is fundamentally insecure, but modern chat services like WhatsApp are encrypted so much better

that WhatsApp is accessible via a browser nowadays? Just visit <https://web.whatsapp.com>.

Two-Factor Everything

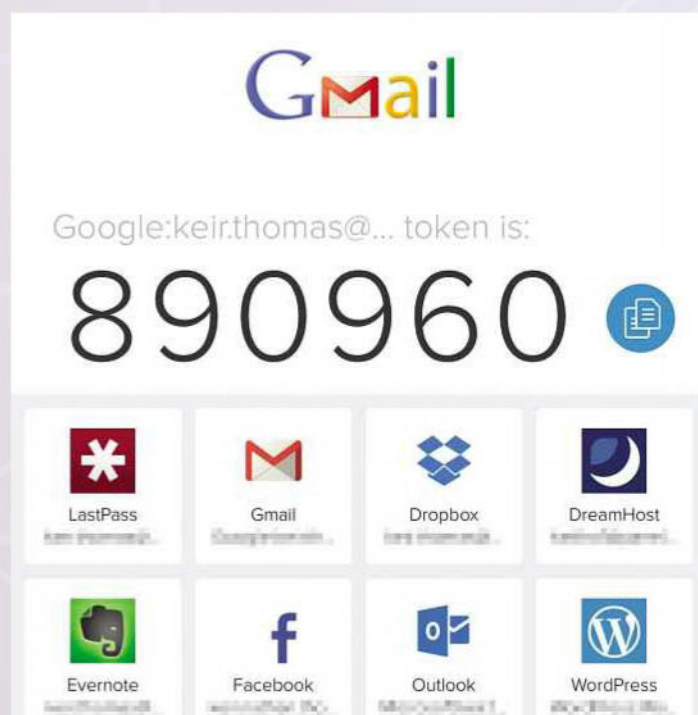
Arguably the biggest boost for online security in recent years comes via two-factor authentication. This sounds infinitely more complex than it is. Put simply, two-factor authentication makes you type a PIN along with your regular password to log into various online services. The PIN might be generated via an app on your smartphone or tablet, such as the excellent Authy (goo.gl/Hzrox1), or it might be sent to your mobile as a text message. Some services work by phoning with a voice message, which means you can use two-factor authentication even if you only have a landline.

A growing list of online services and sites offer two-factor authentication, including Google, Microsoft, PayPal, DropBox and Apple. There are a few authoritative lists online of who does, such as twofactorauth.org.

Setting up two-factor authentication is easy. If the service works by texting you a PIN, or calling via voice call, then you'll simply need to provide your phone number. Beware that some services assume American-style phone numbers, so after selecting the UK from the location drop-down list, you might need to drop the 0 from the front your number – that is, type 171 222 1234 rather than 0171 222 1234, for example.

For those services that use an authenticator app, you'll need to switch to the app on your mobile or tablet, then choose to add a code and simply point the device's camera at a barcode that the site displays when you opt for two-factor setup. It's pretty easy. If your device doesn't have a camera, then you can type the in authentication code manually.

Subsequently logging into the service once two-factor authentication is in place will involve opening the app and typing the code displayed when prompted (usually after you've entered your password) or waiting for the text message/voice call to arrive and typing it when prompted. [mm](#)



▲ Apps like Authy make it simple to use two-factor authentication, which makes online accounts essentially unhackable

MICROSOFT RESEARCH

Images & Graphics

David Briddock reveals some of the best smart image-centric apps and tools projects

In this series we're uncovering some of the most interesting and innovative technology projects from Microsoft Research lab teams across the globe. This time, the theme is advanced graphics and image technology.

Sketch2Cartoon

Cartoons are a generation-spanning, language-independent way to deliver a message or tell a story. However, all too few of us have the artistic ability to draw them.

“ **With Sketch2Cartoon the starting point is a basic freehand outline sketch of the key characters and objects** ”

Online clipart libraries offer a potential solution by providing a virtually unlimited source of graphical objects and elements, but the keyboard-centric user interface isn't ideal, especially for younger children.

However, the popularity of intuitive pen or a finger input on today's touchscreen devices offers a new opportunity, so a Microsoft Research Asia team led by Jian Sun and Ying-Qing Xu has created Sketch2Cartoon, a novel clipart image search engine with an intuitive sketch-based interface.

With Sketch2Cartoon, the starting point is a basic freehand outline sketch of the key characters and objects – essentially any idea that springs to mind.

In real-time the ClipFinder search engine analyses the sketch strokes and generates a set of likely clipart

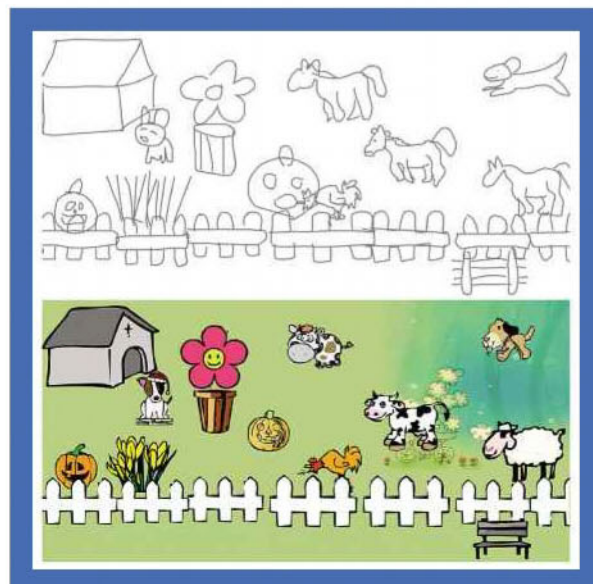
matches, selected from millions of internet-hosted images. Now it's just a case of choosing the most appropriate clipart images for the cartoon.

Each selected image is vectorised so it can easily be moved, rotated, scaled and recoloured. An image chosen from a background image collection completes the cartoon creation process. And it's all been achieved using simple finger/stylus movements and gestures.

So if you have great creative ideas but lack the artistic skills, Sketch2Cartoon could be the perfect solution.

Few of us have the time or inclination to become an expert at panoramic photography, which is why the Interactive Visual Media group at Microsoft Research has developed the Image Composite Editor (ICE) tool.

ICE uses computer vision techniques to stitch multiple pictures together into a seamless, ultra-wide-angle masterpiece. First released in 2008, the team added new features over the years to make the process even easier.



your panoramic series pictures is poorly framed, leaving a void in one area of the panorama. Automatic Image Completion will use pattern recognition technology to magically fill in the missing frame.

Another ICE improvement avoids starting all over again if a mistake is made partway through creating a panorama. Now you just hit the 'Back' button, make the necessary changes and continue from where you left off.

And the team really added a slick video-to-panorama feature that creates a stroboscopic motion panorama by stitching together frames from a video.

“ If you have great creative ideas but lack the artistic skills, Sketch2Cartoon could be the perfect solution ”

Despite its work-in-progress status, ICE has already become a foundational technology for the aerial and Streetside imagery found in Microsoft's Bing Maps.

To discover ICE's potential for yourself, choose a suitable location, snap some photos, download the software and give it a whirl.

Xim

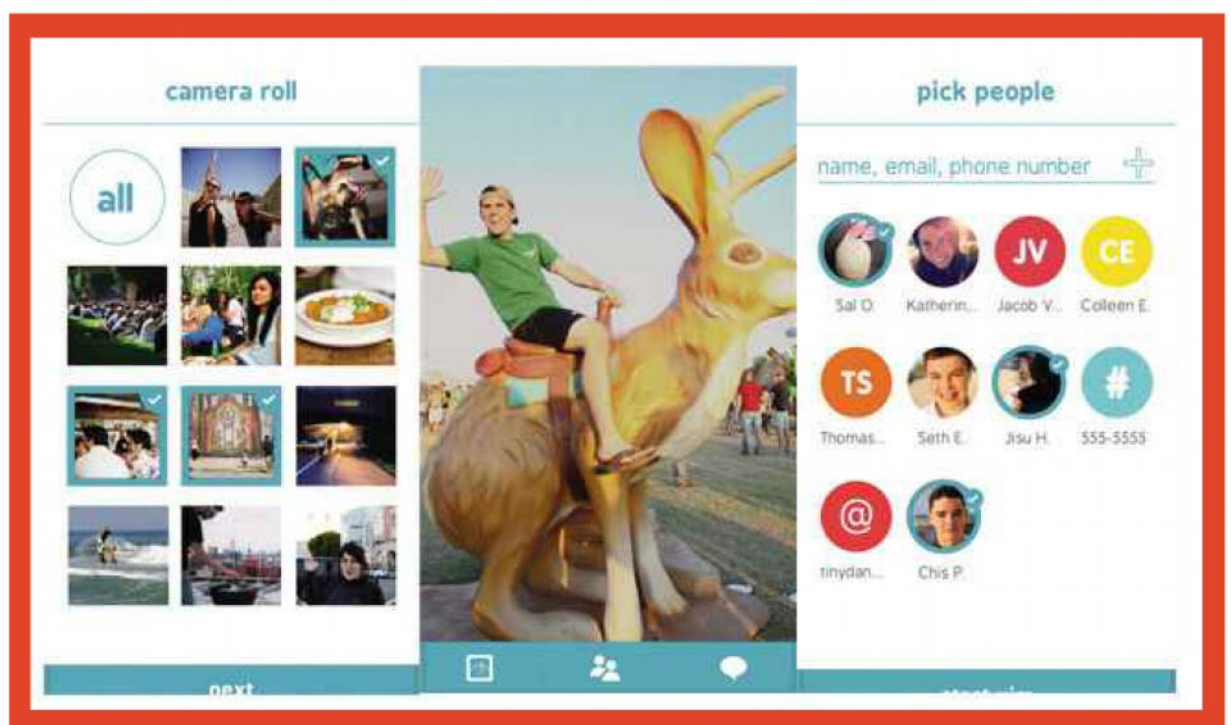
These days, pretty much everyone take photo sharing for granted. Anyone with a mobile phone can snap a photo and seconds later post it to Facebook, Twitter,



One impressive example of ICE's potential is the Gigapixel ArtZoom experiment. ArtZoom stitched together nearly 2,400 separate 22-megapixel images of Seattle (taken with a Canon 1Ds Mk III and 400 mm lens). The final 360-degree view captures the cityscape in stunning detail.

So how does ICE create a panorama? Well, it's based on four easy-to-navigate steps: import, stitch, crop and export. However, you can also apply lens or projection effects, such as fish-eye, spherical, orthographic and stereographic. The final panorama can be saved as an ordinary image, as a Deep Zoom web page or shared on the Photosynth website.

ICE is still a work-in-progress project, so new and updated features appear all the time. One example is the Automatic Image Completion feature. Say one of



Instagram or numerous other places in the cloud. But in the summer of 2013, Steve Ickman, a software-design engineer at FUSE Labs (which is part of Microsoft Research), thought he could offer a different solution.

Rather than post to the cloud, Ickman wanted to share photos with a select personal group – a bit like passing the physical phone around a circle of friends, but he also wanted to avoid mistakenly sharing a photo with someone outside this personal group.

Ickman's turned his vision into a product called Xim (pronounced zim). Today Xim is a free-to-download app (getxim.com) for Windows, Android and iOS smartphones.

Xim synchronises a group photo sharing experience across multiple phones in real time. It delivers an interactive sharing experience, where participants can admire and explore the exact same image at the same time using swipe, pan and zoom gestures.

A Xim app owner can pick as many as 50 photos, then choose who to invite. Xim uses the phone's contacts list to send out photo-sharing invitations via text or email.

A key feature is that while the Xim system relies on cloud-based storage, the photo-sharing session isn't permanent. In fact, photos only persist for around one hour.

You don't actually need to have the app installed to participate in Xim photo-sharing. However, if others in the group have installed the Xim app, they can also add content to the Xim.

All very useful, but Ickman isn't standing still. He's working hard to make Xim even better.

Already you can stream Xim photos onto the big screen by tapping the display icon and selecting the Xbox One, Google Cast or AppleTV option. And at some point in the future he'd like to revise the user interface to simplify the way large groups of people are connected.

Today Xim is a smartphone-only technology. However, Ickman has plans to expand the Xim experience to other mobile devices, such as tablets and maybe wearables.

PhotoSynth

Photosynth was created when Microsoft's Live Labs, and later Bing Maps, transformed a Photo Tourism idea into a photo sharing web service.

Today Photosynth (photosynth.net) is a powerful set of tools for capturing and viewing the world in 3D. This technical preview status technology is aimed at anyone with a digital SLR or a point-and-shoot camera.

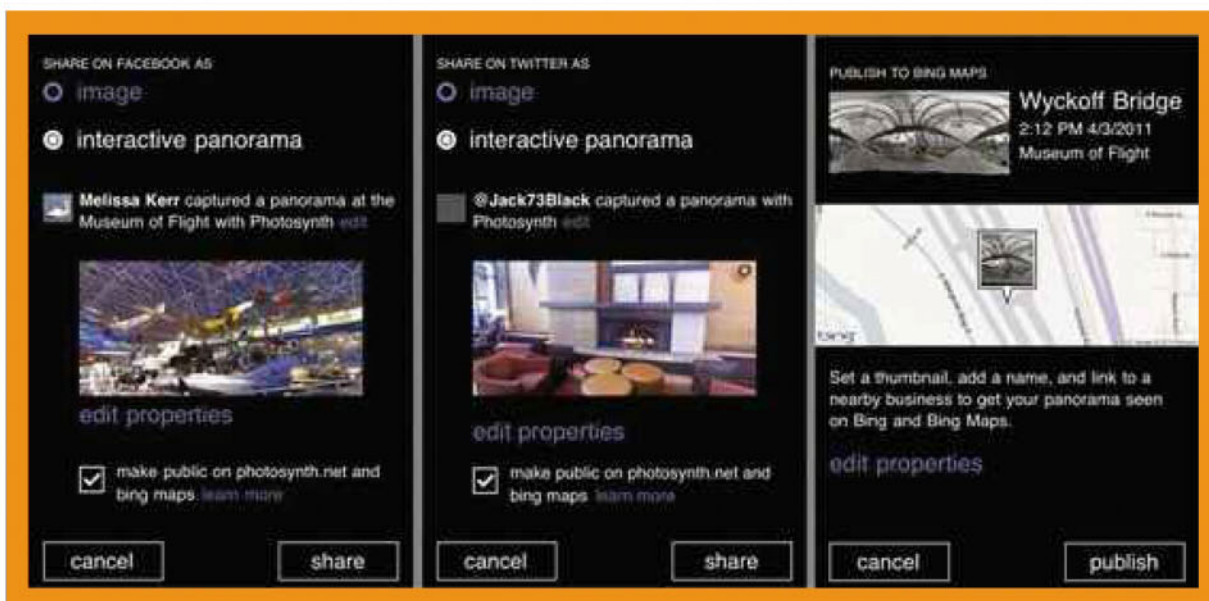
How does it work? Well, Photosynth offers two complementary methods for creating immersive 3D experiences. These methods are called panoramas and synths.

Creating a panorama involves shooting a series of photos from a single location using a single zoom level. The idea is to capture a sense of what it feels like to stand at that particular location. This often is done with a 360-degree rotation movement, but it can be any type of stitchable photo series, so be creative.

“ ICE uses computer vision techniques to stitch multiple pictures together into a seamless, ultra-wide-angle masterpiece ”

Panoramas can be made directly on your mobile phone (Windows Phone and iPhone) using the Photosynth app. The composite image is navigated with simple left/right, up/down and pinch zoom gestures.

Alternatively the photos can be processed using the Microsoft Research Image Composite Editor (ICE) and the Photosynth Desktop application. And anything created by Photosynth can be published on



Amber

Transforming young lives



Amber transforms lives by offering a fresh start to unemployed, homeless young people seeking direction in life.

Amber builds confidence, motivation and self-belief.

Amber works



**To donate text AMBR03 to 70070 and the amount
or go to www.amberweb.org**

Registered charity number 1051388

Bing, embedded in a blog post, added to a website or shared with Facebook friends.

In contrast, Synth works by capturing the different sides or specific details of an object. In the early days of this project, Synth's capture was the only option. Today it still remains a key feature.

Once again the Photosynth Desktop application is required to generate a Synth. However, the final result is a little more complex to navigate than a panorama, as you'll need to physically move from photo to photo.

To start creating with Photosynth, all you'll need to do is create an account and download the app and tools.

For Windows Phone 7.5, the Photosynth app is available on the Windows Phone Marketplace, while iPhone owners can find it on Apple's App Store. To make panoramas from a Windows PC, you'll need to install both Image Composite Editor (ICE) and the Photosynth application.

Spin

The goal of the Spin project (goo.gl/gTD5BI) is to capture photorealistic 3D models of objects using only a simple everyday camera.

The technique requires no special lighting, no sensors or any other equipment, and it's equally applicable to a mobile phone, a point-and-shoot camera or a digital SLR camera. The result can be shared and viewed on a phone, in a web browser or in a desktop application.

Spin's inspiration originated from ideas presented in a QuickTime VR paper. However, QuickTime VR object movies require special capture rigs to ensure smooth rotation and are typically limited to a finite number of viewing angles.

In a collaboration between Microsoft Research and the University of Washington, a team migrated the QuickTime VR paper's ideas into the realm of handheld and crowd-sourced photography via something called the Photo Tourism project.

Links

- ICE project: goo.gl/CKS8xh.
- Xim app: getxim.com.
- Photosynth project: photosynth.net.
- Spin project: goo.gl/gTD5BI.
- Fuse Labs video tour: goo.gl/z6KK4F.

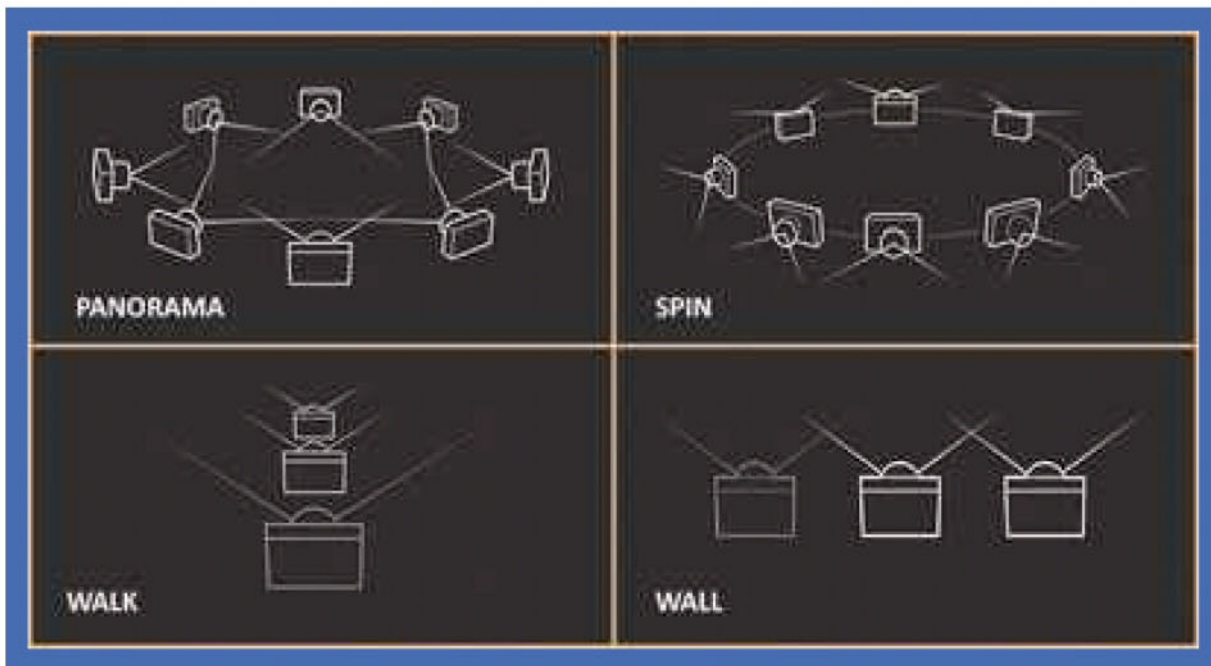
The Photo Tourism project created a piecewise-planar layer technology solution, where multiple layers are combined in an additive fashion to model the reflection and transmission of light that occurs at specular surfaces. This technology can render a variety of real-world scenes with reflections.

The original goal was to have real-time capture apps for Windows Phones, a series of interactive viewers

“ Xim synchronises a group photo sharing experience across multiple phones in real time ”

for various platforms, plus an Azure-based service, but things have changed a little.

Today, the once stand-alone Spin technology has become an integrated feature of the Photosynth Desktop application, and the Photosynth team have adopted the Spin project's Azure service as the starting point for re-engineering the system into a cloud-based offering. [mm](#)

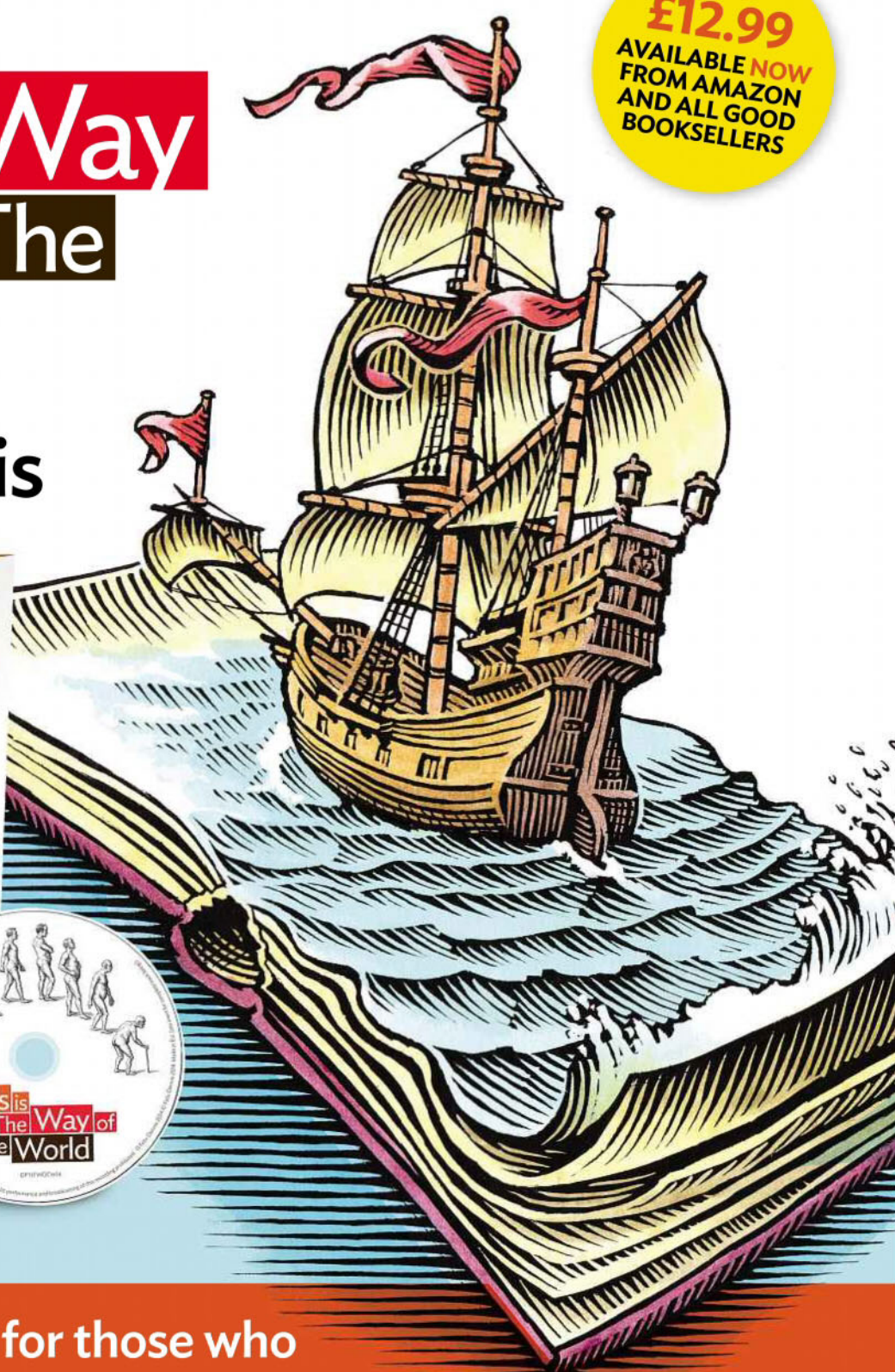
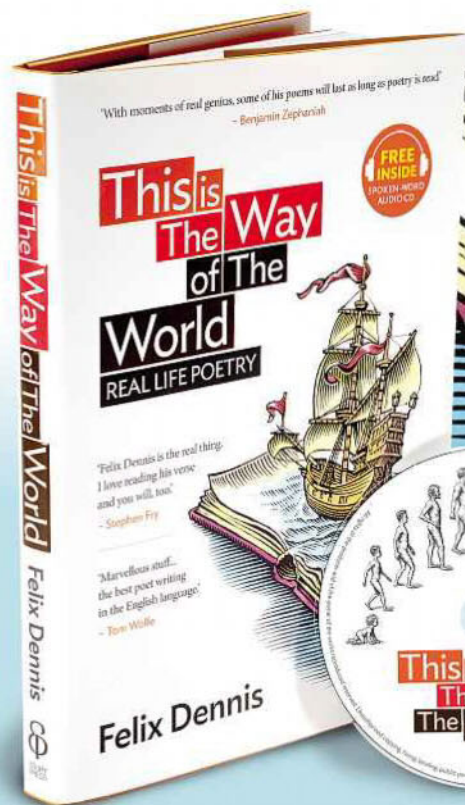


'With moments of real genius, some of his poems will last as long as poetry is read.'

– Benjamin Zephaniah

This is The Way of The World Felix Dennis

RRP
£12.99
AVAILABLE NOW
FROM AMAZON
AND ALL GOOD
BOOKSELLERS



A book of poems for those who don't read poetry (as well as for those who do!)

A collection of 'real life' poems by Felix Dennis, one of Britain's best-loved poets, charting life's course from infant to endings with illustrations by Bill Sanderson.

www.felixdennis.com contains many poems, published and unpublished, as well as a library of sound recordings and video footage of Felix Dennis's verse and poetry tours.



Component Watch

They may not be the most expensive bit of kit, but you could still save a handy amount on one of these handy Bluetooth adapters

Bluetooth connectivity is becoming more and more common in portable devices. Laptops, phones and tablets all have Bluetooth built in, and that means more and more of us are using Bluetooth accessories with them. What about your desktop system, though? Or maybe a laptop which doesn't have the technology built in? Generic USB Bluetooth adaptors are cheap if you look in the right places, but what if you want one that's cheap AND has the benefit of a brand name backing up its capabilities? Then things are a little tougher. That's why we've found the best prices for you.

Deal 1: Dynamode BT-USB-M2
RRP: £5 / Deal Price: £2.47

This super-cheap adaptor is only Bluetooth 2.0 compliant, which explains its low price – most modern devices use the more versatile Bluetooth 4.1 standard. Still, if you've got old devices that wouldn't benefit from a faster connection or want to save yourself a few quid at the expense of bandwidth, you won't find better than this. At roughly the same price as a regular copy of *Micro Mart*, you know it's a bargain!

Where to get it: CCL (bit.ly/1bxP85W)



Deal 2: TRENDnet TBW-107UB
RRP: £10 / Deal Price: £7.52

This Bluetooth 2.1 dongle is considerably more expensive than Dynamode's 2.0 version, but that .1 makes a lot of difference to compatibility it offers you. What's more, it supports seven simultaneous devices, has a 10 metre range and supports secure simple pairing so it's easier to connect devices too. At £7.50 it's three times the price of our first example, but it's still a bargain – small, discrete and ultra-compatible, its performance is far more reliable than the numerous unbranded alternatives you'll probably come across on your travels, and ultimately that's a good reason to pay extra for it.

Where to get it: CCL (bit.ly/1lgpLUE)



Deal 3: Belkin USB 4.0
RRP: £22 / Deal Price: £8.88

Belkin's adapter is normally a little overpriced, but if you shop around you can find it for a fantastic discount. Its Bluetooth 4.0 support is comprehensive and the device itself is compact, and compatible with both Mac and Windows systems. Normally far too expensive to recommend despite its strong brand name, if you're quick enough to catch this discount then there's no question you should go for it!

Where to get it: CCL (bit.ly/1P0jrVr)



Deal 4: Asus USB-BT400
RRP: £10 / Deal Price: £9.48

The king of high-quality wireless peripherals, Asus, has applied its skills to this low-price Bluetooth 4.0 adaptor that's backwards compatible with earlier versions of the standard, supports Bluetooth Low-Energy (BLE) connections as well as the superior connection speeds and range capabilities of its more advanced standards. If you're looking for a Bluetooth adapter, this is the one that does everything you want. The discount isn't huge, but the value definitely is.

Where to get it: Ebuyer (bit.ly/1dNcLZS)



Deal 5: Startech Mini USB Bluetooth Adaptor
RRP: £12 / Deal Price: £9.50

Startech's version of a Bluetooth 4.0 adapter is available for only a little more than the Asus and Belkin version and offers many, if not all of the same features. All things considered there's no particular reason to dismiss it, but reputation alone suggests that one of the others will probably have the edge. Startech is known for its budget hardware, and when you can find bigger brands at smaller prices, it's got little to recommend it. Despite that, if you can only find this then there's no reason to actively avoid it. It certainly works.

Where to get it: Ebuyer (bit.ly/1GZatRc)



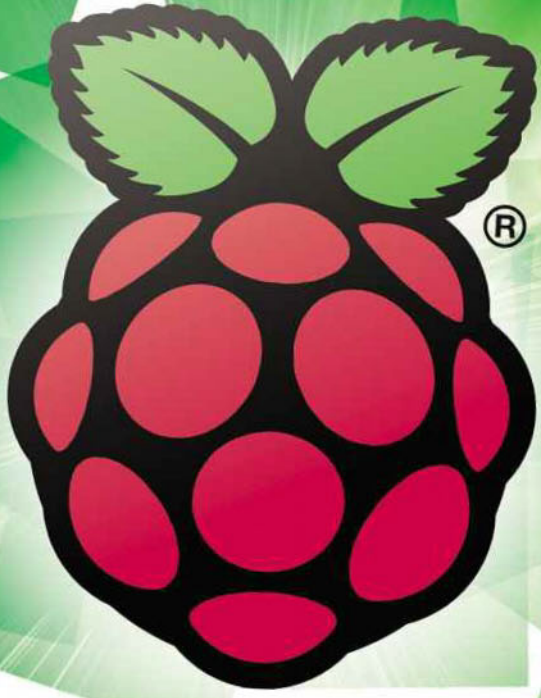
ON SALE NOW



MAGBOOK

Ultimate Guide to **Raspberry Pi**

NEW & EXPANDED!
Build your own
'Mars Explorer'
robot!



- ▶ Create your own games and projects
- ▶ Learn programming from scratch
- ▶ Perfect for every age, from 8 to 88!

ONLY
£7.99

Order your print or digital MagBook
at magbooks.com



How Old Do I Look?

Tesla Builds Battery For Home

Game-changer? Quite possibly

Electric car manufacturer Tesla has announced batteries for home and businesses that could be used as a backup in case of any power outages or blackouts.

The batteries would also mean that a household could operate away from a power grid and would be a major boost for those living in remote areas. Excitingly, this isn't a pipe dream as the company is planning on

shipping the lithium-ion batteries to US installers by the summer and Tesla head Elon Musk said that this could enable a "zero-emission power generation".

The 7kWh or 10kWh batteries will cost a couple of thousand pounds, but that could ultimately pay for itself over the years. You have to admire Musk and chums for their achievement here. A genuinely innovative, revolutionary, development.

Edge Sucks!

Microsoft protects brand property

Perhaps preparing itself for a backlash already, Microsoft has reportedly told online brand protection company MarkMonitor to register domain names MicrosoftEdgeSucks.com,

MSEdgeSucks.com and WhyEdgeSucks.com, among various others. *The Register* reports that it's registered the domains for a year, so maybe it expects any initial grievances to shuffle off quietly and quickly.

American Airlines Grounds Planes – iPad App To Blame

Technical glitch stops tablets

Apple would have appreciated the PR from having airlines and pilots admit that they use tablets to fly people safely from A to B. It may not want the kind of PR coming out of American Airlines, however.

The FliteDeck application is used by pilots to provide them with charts and information on the flight, but a fault with

the app caused iPads to stop working altogether recently, with the end result being dozens of grounded aircraft. AA went with a paperless cockpit two years ago as part of a cost-cutting exercise (the heavy paperload was apparently adding to fuel costs).

Incidents like this hardly help the company to justify that move entirely, though, But hey, the matter has since been fixed and planes are up and running again.

New website tells it like it is

Not content with making two news stories this week, here's another. Microsoft's facial analysis tool How Old Do I Look has been released to make everyone using it feel dreadful about themselves.

The fun and games are at how-old.net and it uses "cloud-based algorithms" to check out a human face and then guess said face's age and sex from

that photo. You may be left giddy with humility; you may also be left fuming that this is how the world views you. What's for sure, though, is that within a day of the site launching, 15,000 tweets reportedly registered their participation and, it has to be said, many weren't too happy. As an exercise in machine learning, fantastic... As an exercise in making you feel better about yourself, not so great it seems.



Microsoft BUILD Conference: Highlights

Hololens is shaping up nicely

Some of Windows 10's features were fully realised at the company's BUILD conference in April and there were some key points we'd like to focus on.

First off, Microsoft dearly wants the OS across mobile devices and systems everywhere. Indeed, Windows boss Terry Myerson said that the firm wants it on a billion devices within a few years of its release. Wowsers.

Then the firm also announced that it's keen on firms to release mobile applications on the OS, inviting developers to bring existing apps and games to Windows universal apps with the help of a couple of software development kits. Exciting.

This. Is. Sparta... Oh, sorry. Microsoft's Project Spartan is now Microsoft Edge. Yes,

Windows 10's browser has the Edge name placed on it, which is quite snappy and probably altogether better than Spartan. Among Edge's feature set is digital ink annotation, integration with Cortana and a faster search experience.

And finally, we need to talk Hololens. Microsoft's holographic platform was shown off to conference

attendees in the form of a wee robot, complete with his own holographic avatar. Thanks to Hololens, that little robot found its way around the stage with no problems. Developers will be encouraged to do something useful with the platform for consumers and if nothing else, this is something genuinely forward-thinking from the Camp Redmond.



If you're building a new PC, there's little more upsetting than pushing the power switch the first time, only to be met with a distinctive lack of... well, anything at all.

And this problem isn't limited to new builds either. For no apparent reason, a previously functional computer can suddenly cease to function.

Sometimes, you might get spinning fans and a black screen; other times, nothing at all will happen.

Either way, it's something most of us have experienced at some point, and when it happens, any help is likely to be welcome. Hopefully, this week's guide to solving this problem will be able to help you in your hour of need.

If none of our suggestions help, though, remain calm, and just remember, you can always take out the hard drive and get all your data onto a new PC – assuming it's not the storage that's broken, of course...

Anthony

Editor

Meanwhile... On The Internet...

Reddit is an internet phenomenon that's grown to a quite eye-popping size, but it has consistently managed to avoid being seen as a big corporate entity in the way that some other similar rapidly growing services (say, Facebook) have.

This has been partly down to the fact that it runs on a fairly skeleton crew (tinyurl.com/Motl1362a) and has, in the past, actively avoided attempts to moderate and control what its platform is used for. Unfortunately, at least for anyone trying to make money selling adverts on the service, that means that it doesn't always make the ideal candidate for monetisation. However, with news breaking that it's moving into content creation (tinyurl.com/Motl1362b), that may be beginning to change, and we may well begin to see overt evidence of its attempts to try to justify the kind of financial support it has received so far by generating improved revenues (tinyurl.com/Motl1362c). It's certainly a shift in focus for the service, which, while no doubt making headlines and breaking stories (as its spiffy promo vid points out (tinyurl.com/Motl1362d), doesn't actually create much itself.

By taking a limited control over parts of its output, rather than leaving it all in the hands of its readers, it appears to be attempting to create a better platform for building a profitable business (tinyurl.com/Motl1362e). We'll no doubt see whether this is the first of a series of moves to bring the service into a more corporate form – not something its user base is likely to be wholly appreciative of, we would suspect.

Greek headlines this week were dominated by Josh Whedon's decision to leave Twitter, and his 1.13m followers, behind (tinyurl.com/Motl1362f). The director of *The Avengers* and its sequel posted a goodbye message before deleting his account and kicking off a too-and-fro of theorising as to why he'd done it (tinyurl.com/Motl1362g). Was it studio meddling? Was it the criticism he'd received over certain elements of *Age Of Ultron*? Was he preparing to announce that he would be directing a *Star Wars* movie (tinyurl.com/Motl1362h)? Or maybe was he being totally serious about taking some time off? Who knows?

We may not know the real reason for some time, if ever, but it's another tiny blow to the service that has seen a constant stream of negative publicity related to the activities of trolls on the site. Not least in the wake of the far more serious #Gamergate affair and the recent treatment of Rio Ferdinand (tinyurl.com/Motl1362i)

Ordering things over the internet is undoubtedly a very convenient thing, as are the apps that allow us to do so. These two wonders of the modern word can also, it would appear, have other advantages. Just ask Florida resident Cheryl Treadway, who used an order via Pizza Hut's app to get herself out of a potentially dangerous situation in which it appears she and her children were being held hostage by her knife-wielding boyfriend (tinyurl.com/Motl1362q).

After finally convincing him to let her use her smartphone to order a pepperoni pizza, she used the app's comment facility to explain her predicament and request that the restaurant call 911 on her behalf, which they duly did – even though it was something that The Hut's manager said she'd never seen before.

You'll no-doubt be please to know that the police did respond to the request, and the situation was resolved without further incident or injury.

The closure of services like Grooveshark, the increasing pursuit of torrent providers and streaming services, and the rumours of Spotify coming under pressure to halt advert-funded streaming (tinyurl.com/Motl1362j) may lead you to wonder just how long it will be before content providers start to pay significantly more interest in services like Twitter's Periscope. Especially, we suspect, if the company's CEO keeps sounding off about just how many people are using it for outright piracy – such as appeared to be the case following the much-hyped Mayweather vs. Pacquiao fight (tinyurl.com/Motl1362k), when Dick Costello promptly took to his native platform to announce **@periscopeco** "the winner" (tinyurl.com/Motl1362l).

Don't feel too sorry for the PPV vendors just yet, though; they still made a mint from the event. However, with HBO already firing a shot across Twitter's bough over illegal streams of *Game Of Thrones* (tinyurl.com/Motl1362m), don't expect it to be too long before the social network goes on a charm offensive to head off industry criticism of its new 'must-have' app.

Aaaaaaaand Finally...

There are all sorts of reasons to like Hugh Jackman: he sings, he dances, he's Wolverine, he rides bikes around when he's in strange cities... he's Wolverine... I'm sure there are ladies (and, no doubt, gentlemen) who could probably think of a few more (as this very NSFW informational video explains: tinyurl.com/Motl1362n), but we're going to concentrate on his sense of humour for now.

We like Hugh Jackman, we love the cartoon *Adventure Time*, we like John DiMaggio (who provides the voices for that show's Jake The Dog and *Futurama*'s peerless Bender), we like pancakes and – like much of the internet – we love bacon. Put them all together, and what do you get? Hugh Jackman miming the 'Bacon Pancakes' song (tinyurl.com/Motl1362o)... No need to thank us. Oh, and here's a cat in a fishbowl: tinyurl.com/Motl1362p. You're most welcome.

.AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

We don't 'do' sport in these pages much – or at all, if we're honest. This is pretty slick, though, so we'll let it pass: tinyurl.com/Motl1362r. It's being dubbed the 'point of the century' in table tennis circles (which are a thing, apparently) and was contested by Ma Long and Fang Bo in the recent world championship. It also reminds us to watch the awesome *Ping Pong* again (tinyurl.com/Motl1362s).



Caption Competition



"New PC builder goes looking for the 12V rail"

You know what they say about trains: you wait ages for one, and then, well, then it probably gets cancelled, and you have to find your own way home. Er... captions!

- **Thomas Turnbull:** "Wow, this train app's so good you'd think you were there."
- **John van Someren:** "The sound on this model railway simulator is incredible."
- **Mark McE:** "Some people will do anything for free wi-fi, no matter what the speed."
- **Dwynnehugh:** "I just pulled the chain in the carriage and here I am."
- **JayCeeDee:** "TrainSpotifier finds some new tracks."
- **JayCeeDee:** "Actually, I can hear the tracks better without the headphones."
- **JayCeeDee:** "Damn, I spent so long booking the ticket that I missed the train."
- **Paul Mace:** "If you want to get better at something, TRAIN!"
- **Gregg Woodhouse:** "The new Train album was louder than he expected."
- **Alan Cox:** "All aboard the Orient PCI Express!"
- **Rick Matthews:** "Better Than Life VR system launched. Even the trains are on time!"

Many thanks to everyone who entered, and well done to Steve Freeman, who suggested "New PC builder goes looking for the 12V rail."

To enter this week, head to the 'Other Stuff' section of our forum (forum.micromart.co.uk) and say something funny (but not too rude) about the picture below or email us via caption@micromart.co.uk.



America Announces Gaming Greats

15 finalists include some classics

America has its share of museums, but perhaps the finest among them is the Strong National Museum of Play. A historic look at toys and games, including video games, the museum includes the International Center for the History of Electronic Games. Check out the website at www.museumofplay.org – it does look truly amazing.

It also now plays host to the World Video Game Hall of Fame, which has named its 15 finalists for consideration for inclusion, including such classic titles as *DOOM*, *The*

Legend of Zelda, and *Pac-Man*. More recent games like *Angry Birds* and *World of Warcraft* also make the list and all games were selected from public nominations. The ones that were put forward had to meet four criteria: icon-status, longevity, geographical reach, and overall influence.

What? No *Horace Goes Skiing*? *Manic Miner*? If you'd like either of those to make it for a future vote, head to www.worldvideogamehalloffame.org/nominate for details on the the 2016 induction. This year's inductees will be announced next month.

US Resident Builds Up Mighty Phone Charge

Over \$20,000 in long-distance charges

A customer of phone company AT&T in the States managed to bring upon himself a bill of over \$24,000 in long-distance charges over a two-month period.

The massive charges were due to an AOL dial-up web connection that had been setup incorrectly, so the fella

concerned – an 83-year-old gentleman – ended up dialling a long-distance number whenever it accessed AOL. This simple error meant that he was building up an almighty phone bill for two successive months.

A technician fixed it for him and when the LA Times got involved with the story, AT&T waived the charges.

Snippets!

Apple Watch Tat Fail

Apple has admitted that complaints over its watch not working properly on someone with tattoos are quite valid. It turns out that light sensors on the watch can't handle dark tattoos as they "impact heart rate sensor performance" according to an Apple statement on its website. "The ink, pattern, and saturation of some tattoos can block light from the sensor, making it difficult to get reliable readings."

Didn't your mother always tell you that tattoos were a bad thing? Well, there you go.

Windows 7 Grows

According to Netmarketshare, the breakdown of the desktop operating system market share now confirms that Windows 7 accounts for 58% of the market, a slight increase on the same figure since the previous month.

Windows XP reported a dip of around a percent to under 16% of the market, but that's still no bad share considering how old XP is.

Grooveshark Gone

Steaming music service Grooveshark is no more, with a statement on its website confirming that it hadn't got the required licences for any of the copyrighted music that was being shared on it.

The statement said: "We made very serious mistakes. We failed to secure licences from rights holders for the vast amount of music on the service. That was wrong. We apologise. Without reservation."

Grooveshark was being sued by various record labels over copyright infringement, and this move was part of a settlement agreement that will see its owners avoid potentially massive fines being imposed by the courts.

DOS In Twitter Takedown

Marvellous idea scuppered by service

Any way to play games is a winner with us and when it's something genuinely unique then we are well and truly on board. So when thousands of DOS games that could be played in your browser via social-messaging platform Twitter were announced, we were delighted.

People could tweet links to games found on the Internet Archive (archive.org) and play them within the platform itself. Life was sweet, with direct

access to the likes of *Wolfenstein 3D*. Oh yes.

Then, Twitter spoilt the party as it killed it off, citing the service's Terms of Service. Essentially, embedding games isn't allowed: "Do not build end-to-end interactive experiences inside the video or audio player unrelated to Player Card content, such as the following: purchasing, gaming, polling, messaging, and data entry."

Darn it.



Apple Watch Makes Mighty Mark-Up

Hardware costs around £50

Bought yourself an Apple Watch yet? Look away now as Apple has made a tidy £250 profit – at least – at your expense.

The stats come from a breakdown of the hardware used in the device by IHS Technology and it claims that the combined

cost of the technology in the device is around £54. Given that they sell for at least £299, and at up to £13,000, Apple is making a mint from this. In fact, this represents the lowest hardware costs compared to retail price of any Apple phone that IHS has researched.



Meet The Scorpion!

Rugged name for rugged all-in-one radio

The festival season is coming and Etón's Scorpion is targeted at any music lovers among you who may need to light your way back to your tent while listening to the radio and opening up a bottle of your favourite tasty beverage... all at the same time!

With a built-in rechargeable battery, this solar-powered radio,

phone charger, flashlight and bottle opener can be brought to life by its hand crank, solar panel or DC adapter. It costs £50 from www.nevadaradio.co.uk and its splash-proof, rugged exterior means that you can take it with you wherever you go.

It's a silly name, perhaps, but that's a whole load of features for your money.



Amazon Ups Super Saver Limit

£20 minimum spend to qualify for free delivery

In a move which is surely going to upset many an Amazon consumer, the company has once again increased the spending limit for customers wanting to qualify for its free Super Saver Delivery service.

Having already imposed a £10 qualifying spend back in 2013, the company has now doubled that figure to £20. The exception to this is on any order containing books, which remains at the £10 minimum spend limit, but this

is a move that is bound to lead to many a shaking of the head among customers.

It might have a welcome impact on high street spend, however, as prices including the delivery charges come more in line with those at brick-and-mortar retailers. Why the move? Well, it's a fair bet that Amazon is attempting to drive more people to its £79-a-year Prime service, which offers unlimited free delivery. A risky move, we'd say.

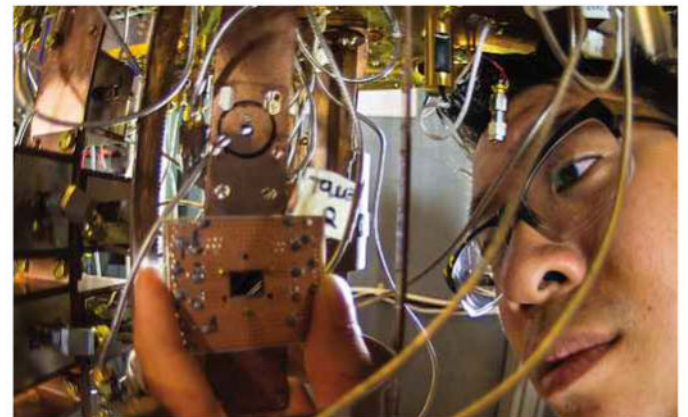
amazon.co.uk

IBM Steps Towards Quantum Computing

Stand well back. Geeks at work

Scientists over at IBM have been working on research surrounding quantum computing for a while and it turns out that they have made some big strides lately. For the first time, they have the ability to detect and measure quantum errors, and have also demonstrated a square quantum bit circuit that could be scaled to larger dimensions.

Quantum computing will be an important factor in future developments in industry and, in layman's terms, IBM's work is important as it's another step towards building a practical, large-scale quantum computer that could solve problems rendered impossible by today's standards. They may be clever, but can they hold their own in a bout of *Mario Kart*? Hey?



Google Introduces Anti-Phishing Extension

Protects from attacks

Those lovely chaps over at Google have put together a new extension for Chrome that should help with keeping phishing efforts at bay. Password Alert will display a warning message should a user type in a password to a website that isn't a Google sign-in page. The result will mean protection for

users from dodgy web pages looking to steal account names and passwords and as this is entirely free, it would seem churlish for Chrome users to ignore this plug-in.

A few websites reported that the plug-in had to be revised within hours of its release, though, as a security consultant noticed that it could be gotten around

pretty easily. But hey, Google fixed the flaw and all is well with the world again.



What To Do When Your Computer Won't Start

James Hunt provides some essential advice for getting your PC up and running again



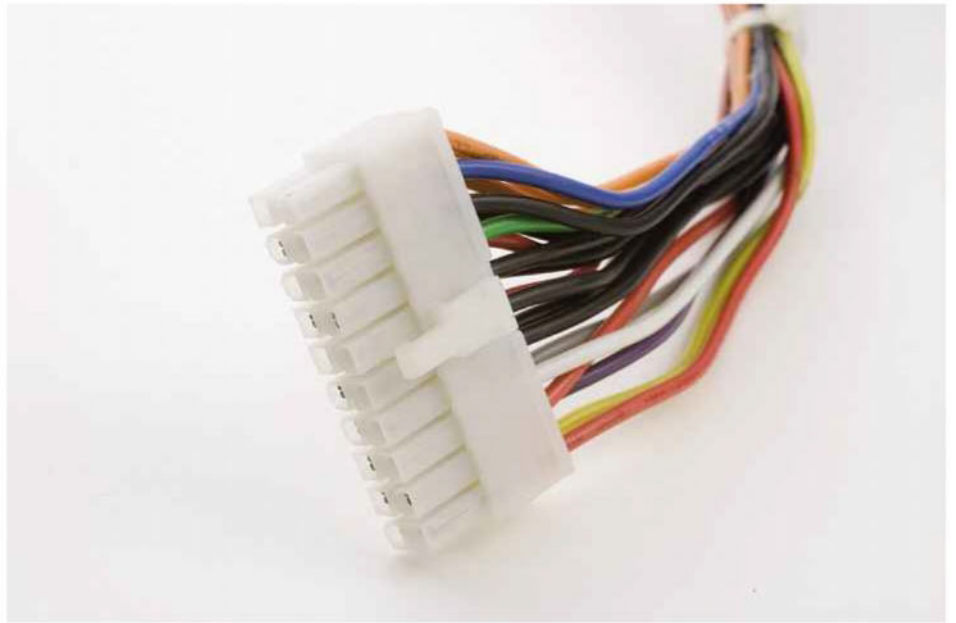
When you use a computer, you learn to take things for granted. You might not know how your processor works, but you trust that it will, and that if it doesn't, something will notice before you do. You'll get an error message or an alarm or some other warning that things aren't working as they should be.

Unfortunately, this doesn't extend to all areas of computing. One of the simplest things users take for granted is that when you press the power button, your system will come alive and boot into your operating system so you can start using it. But what if that stops happening? Where do you even start to fix things? If you're not sure what the answers to those questions are, you should be by the end of this article.

The hardest problem to diagnose is a very simple to explain one: you press your power button and nothing happens. If you've ever tried to help someone fix their own PC, the phrase 'nothing happens' can be a very loaded one, of course. Sometimes it means 'Windows doesn't respond to my inputs', and sometimes it means 'nothing appears on the screen and the computer beeps a lot'. But we'll take it to mean what it literally does: you press the power button and nothing happens. No fans, no hard drive spinning up, no picture on the screen. Nothing. It's one of the more terrifying things that your computer can do, but there's actually good news: it's quite likely that it's nothing severe. But what might it be? Here's how you find out.

Eliminate The Obvious

Not to get too Sherlock Holmes on you, but if you hit the power button and



nothing happens, the first thing to do is make sure the simplest explanations are accounted for. An unresponsive power button might be the result of any number of problems, so crossing them off the list is the only way to find what the actual problem is.

The most obvious questions take the least time to answer, so start with them. Is your system still plugged into the mains? Is the power socket switched on? Is the power socket actually working at all? If the mains ring has tripped or a power cut has occurred without you noticing, that might account for the problem. Test the socket using a different appliance, such as a lamp. If you're using a multiplug, bypass that and go straight to the mains. Once you've verified that the wall is providing

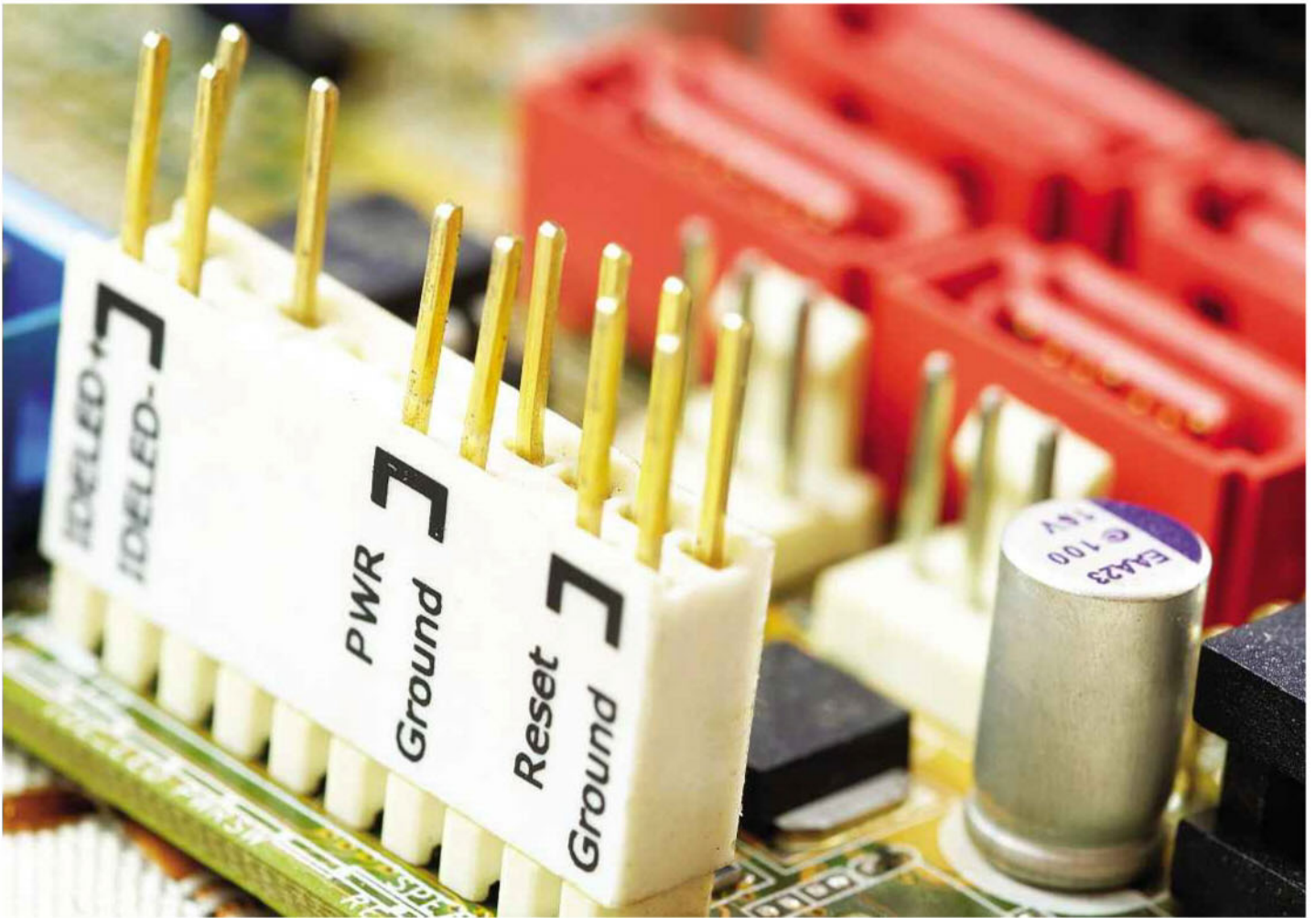
power, you've at least eliminated one line of investigation.

The next step is to check your PC. If power is definitely available at the wall, you need to find out when it's not getting to your system. Check that the power cable and/or kettle lead is properly plugged in. If you're looking at a desktop system, the PSU may have a master switch, so make sure that's set to the 'on' position. If all of these things are properly set up, then good news: you have the simplest part of the investigation out of the way and are well on the way to finding out what might actually be wrong.

At this point, it's a good idea to test a spare power cable or kettle lead if you have one. If the mains socket is working and the power connections aren't impeded, there's every chance that the lead itself has been severed or that the fuse has gone in the plug socket. Swapping cables will quickly let you check whether that's the case. If you don't have a spare lead, it's probably worth replacing the fuse with a fresh one if you have the ability to do it quickly. There's no downside to having a fresh fuse in place, and it'll eliminate the possibility that the lead is to blame, to a reasonable extent, since kettle leads are hardy enough that they shouldn't be severed under normal use.

If you've checked all this and the power still doesn't work, then at least you can be sure that the obvious problem – that the computer isn't actually getting any power – has been dealt with as fully as possible. Unfortunately, the options that remain are more technical and will require you to crack open your PC. Get ready for some invasive procedures.





Checking The Power Button

If the power button doesn't work and you've established that there isn't a problem between the PC and your mains supply, the fault can only be inside your system. There's no way to determine what the problem might be other than testing the components. When you press the power button, it triggers a signal on the motherboard, which sends a signal on the PSU. If the signal is interrupted, your PC won't switch on. Finding out why and where the signal is being interrupted is what we're trying to do, so again it's probably worth checking them in order of difficulty.

The first thing to look at is the power button. Inside your case, you should be able to find wires running from the power button to your motherboard. If you can't, they may have become dislodged or severed somehow, and there's your problem, but either way it's worth checking that they're fine. The leads are normally in pairs of black and red, with a two-pin connector at the end, but they might be colour coded or bundled into larger connectors.

“ If the power previously worked but has suddenly stopped, it's unlikely the pins are incorrect ”

Once you've located them, check that the leads haven't been cut or otherwise broken. If they have, you'll need to replace the entire power button unit. If the leads seem fine, check that they're connected to the right place on the motherboard. For most systems, you'll see one connector labelled 'power' and one labelled 'reset'. They connect to pins on the motherboard (usually labelled 'front panel'), though you may need to check your motherboard manual to make sure which ones.

If the power previously worked but has suddenly stopped, it's unlikely the pins are incorrect, but it could indicate a fault with the wires. One easy way to test is to swap the power and reset plugs over, which will essentially turn your reset switch into a power button. If that works, at least you know the fault is with the power button

rather than anything else (remember to swap the pins back, though!). If that doesn't work, you can try removing the power switch plug and connecting the pins using a jumper cover or (insulated) screwdriver. This will send an 'on' signal, allowing you to bypass the switch itself.

And if none of those things work, then it's unlikely the problem is with the switch itself. Which means you may be in for some bad news, because there are only two things left to check: the motherboard and the PSU.

Checking The PSU & Motherboard

At this stage there's no easy way to tell whether the PSU or the motherboard has broken, but the PSU is easier to get to and replace if anything has gone wrong.

Start by checking the power connection to the motherboard. This is a 20/24-pin ATX connector. Again, if your PC did work but now doesn't, it's unlikely this is installed incorrectly, but on new builds it's surprisingly easy to miss. It could also have been loose and knocked free somehow, though this is a long shot, because the ATX connector has its own clip to keep it in place and oriented correctly.

If this connector is fine, then it's likely that either your motherboard or PSU has broken and needs replacing. There's a slight possibility that the system is trying to draw too much power to start, so you can try unplugging unnecessary components, but at this point it's more likely that something has failed. If you have a spare PSU available, now's the time to dig it out (although don't use a second-hand PSU permanently, as they're more prone to damage and failure depending on how old they are).

If you don't have a spare PSU, you'll probably have to buy one to see if your current one has broken, but it is possible to perform a quick test. All you need is a power-supply tester (which you can buy at retail) or, if you're feeling daring, a paperclip and some electrical tape.

If you want to take the latter approach, then for obvious reasons, you need to take care if you want to avoid an electric shock. Keep the PSU unplugged until you're ready to test it and make sure not to touch any exposed metal while the clip is plugged in. If you make a mistake the shock should only be 24 volts, but that's not to say there's any safe amount of electric shock to take!

To perform the test, simply bend the paperclip straight, wrap it in insulating tape leaving a small amount of exposed metal at each end, then bend it into a U shape so you can slip it into the 24-pin ATX connector causing the green and black wires to link up. With the plug in place, switch the PSU on, and if it works the completed circuit will allow it to power up as normal. If it doesn't, the PSU is likely broken and at least if you spend money on a replacement, you know it'll be worth the expense.

If this works, then assuming you've followed all of the previous steps and ruled out problems with the mains supply, the power cables, the PSU, the power switch and the power switch cables, then we're left with only one other possibility: motherboard failure. This is the most expensive and difficult problem to address, which is why we've left it until last, but

luckily there's only one thing you can do: buy a new motherboard.

So get online and find a replacement, then get ready to dismantle your system, because there's not much else you can do at this point. If you want to double check for faults again, that might be a good idea – if you don't, you might find that you replace your motherboard and still nothing happens, so you want to be absolutely certain that's what has gone wrong before you spend the money and put in the work!

Failure To Reach POST

As alluded to in the introduction of this article, there are other ways your computer can fail to respond when you push the power button. If your system is getting power but still won't boot, there are a few obvious causes worth investigating, and it all depends at what point the failure occurs.

For example, if you push the power button and your system powers up, you know that the PSU, motherboard and power button are probably working fine.

“ If you hit the power button and nothing happens, the first thing to do is make sure the simplest explanations are accounted for ”

Good Practice For Failure Recovery

Any good neurotic will tell you that it's important to have a plan in place so you're ready when the situation inevitably turns against you. Here, we give you a selection of good practice tips to help you prepare for the unavoidable day when your PC fails.

1. Create Regular Backups

The number one tip is an old chestnut that, let's face it, has already have been drummed into you. If you keep regular backups of all of your truly important files, a serious computer failure can be transformed from a potential disaster into a convenient excuse to spruce up your machine, free from the worry that you've lost anything irreplaceable along the way.

2. Familiarise yourself with the recovery procedures

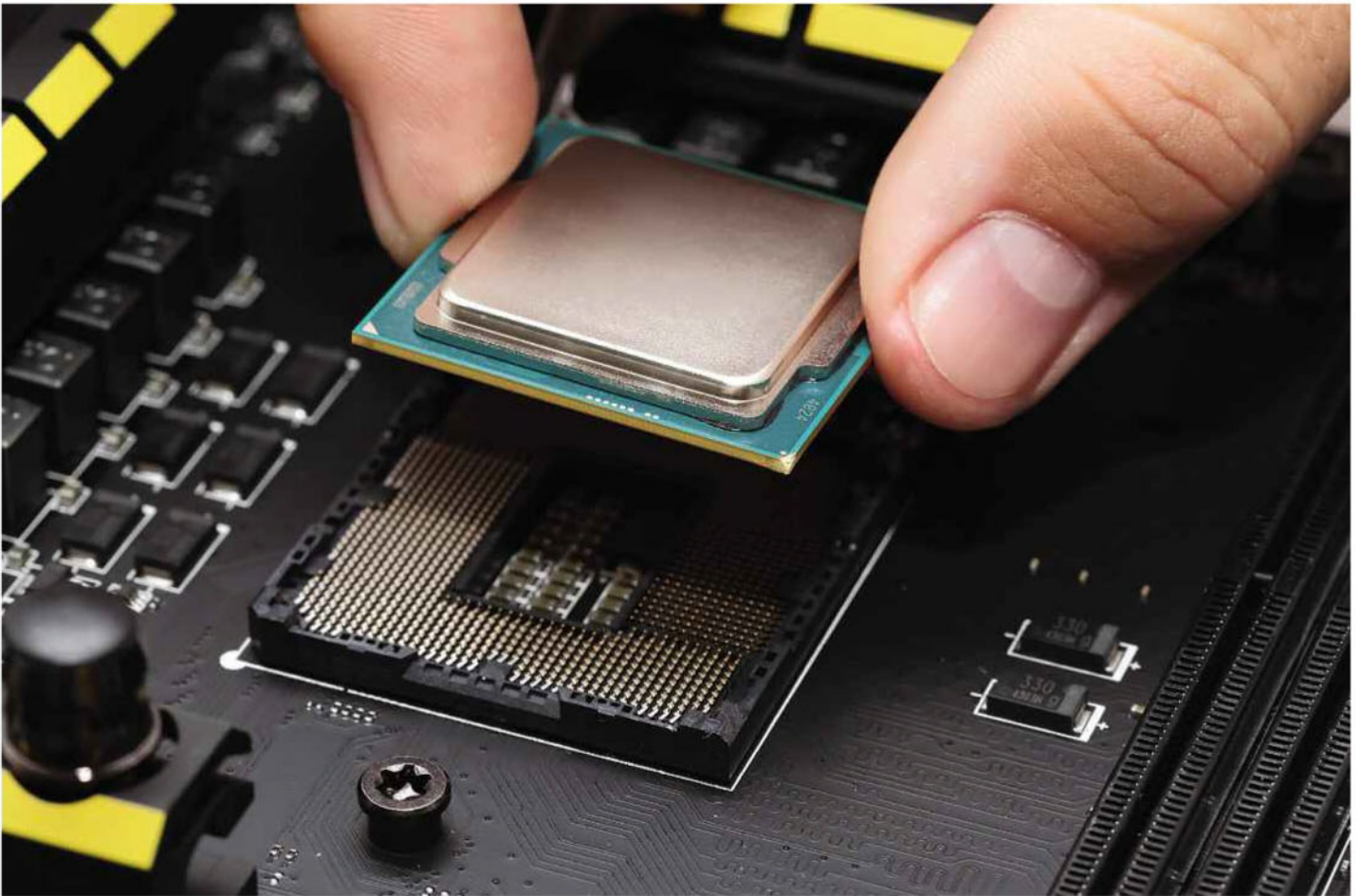
In the same way that you're always shown emergency exits well before you ever need them, it makes sense to have a look around things in the Windows Recovery Console, Safe Mode and your BIOS settings before you actually need them. At the very least, it makes sure you know that you can get to them in the event that you need to, and it means you won't be trying to recover your data in a completely unfamiliar environment if disaster does strike.

3. Keep an up-to-date recovery kit

Recovery kits are ten-a-penny online. It seems like everyone and their dog is maintaining their own set of applications and Linux micro-distributions that help your system back on the road to functionality again. But don't rely on being able to get hold of a recovery kit only when you need it. Instead, buy a USB key specifically for the job and make sure it always has an up-to-date copy of a rescue kit on it.

4. Hold onto spare hardware

You might think that an old graphics card and 100GB hard drive aren't worth keeping around, but on the day your PC decides start to fall apart, you'll be glad you have spare components to hand. Diagnosing a problem is far, far easier if you can eliminate the bigger issues, and one day a spare power cable might be exactly what you need to help you confirm whether you need to buy a new PSU or not.



“ If your system pauses after boot has begun, you should have a much easier time of figuring out what a problem is ”

The next thing you should hear is the POST beep and a boot screen. If that doesn't happen, you're left with nothing but spinning fans, whirring hard drives and a problem to solve.

Usually, this state is caused by a processor that isn't functioning properly. Without the CPU, your motherboard is little more than a chunk of circuitry, and while beep codes can indicate a problem with any other mandatory component of your system, you'll only hear them if the CPU is working.

If the hardware goes no further than powering up, switch it back off and check that your processor is seated properly. If that still doesn't work, it's possible there's a major fault with either the CPU or the way the motherboard communicates with the CPU, neither of which is an easy problem to diagnose. Check for obvious problems, like damage on the

motherboard or processor, and if you can't spot anything, you'll have to find some way of eliminating one possibility.

It's easier to swap out a processor than an entire motherboard, so if you have access to a spare system with a compatible socket, swap your CPU into it and see if it works. If you haven't, you could to just buy a new CPU and hope it's not the motherboard that's died – although it might be worth using the excuse to upgrade your processor and motherboard combination anyway.

It's worth noting that before you try spending hundreds of pounds on new hardware, the problem might still be with your PSU. If your PSU isn't supplying enough power – for example, because you have a particularly powerful graphics card – then it's possible for your system to switch on even though there isn't enough electrical capacity to initiate a proper boot

sequence: fans and smaller components get powered, but the CPU doesn't. To check for this, simply unplug any power-hungry components and/or try another PSU if you don't have one available. This is a rare phenomenon, though, so don't put too much stock in it unless you've eliminated all the others.

Beep Codes

If your system pauses after boot has begun, you should have a much easier time of figuring out what a problem is, not least because you should have access to the beep codes.

If you're not sure what this refers to, that's probably because you've been lucky. Nonetheless, you should be familiar with at least one beep code: the one that tells you your system is fine – a single short beep from the PC speaker, which occurs with every fresh boot. If you're lucky, you'll never hear another.

If you're unlucky, you'll hear a succession of different beeps. You might hear four long beeps, two short ones, two short then two long or any number of other patterns. You'll have to check your motherboard manual, but the pattern of beeps will indicate where in

your system a fault lies. Specific patterns might correspond to severely faulty RAM or a missing graphics device or even a problem with the BIOS. They can be quite specific, which means if you know what the code refers to, it's normally easy (if not necessarily cheap) to fix the problem.

The important thing to be aware of is that beep codes aren't the same from manufacturer to manufacturer and, indeed, they can even differ between versions of the same hardware model. Make sure when you look up the code that you're checking the codes for the right system, otherwise you could end up trying to fix the wrong problem.

And once the problem has been addressed, your computer is free to start the boot sequence – which is the next place things can go wrong.

Boot Failure

In order to start up, your computer looks for a boot sector (also sometimes called a boot record) on the main hard disk. This tells it various things about how to proceed. Generally speaking, a boot disk failure occurs when the boot sector can't be found, but the next step is determining the reason why. Assuming that you actually have a drive installed, there are a few possible causes of boot disk failure.

The most common (and most devastating) is that there's a physical fault with the disk. There's very little you can do in this circumstance, other than replace the disk and maybe send it off to a data recovery centre if your backups aren't up to date. Physical disk faults are fairly easy to notice on mechanical hard drives because the disk will probably sound broken, but if you're unsure (or you have an SSD), then try it in another machine before sending it to the dump. You might get lucky.

If the hard drive isn't displaying any obvious signs of damage, then the problem might be that your PC is trying to boot from an inappropriate device. Most PCs are configured to check for USB devices and bootable CDs before a bootable hard drive so in the case of a serious error you can use a recovery disk. As a result, however, you can find your PC claiming that the boot device is corrupt or unusable when what it actually means is 'This USB thumbdrive should have been unplugged before you hit restart'.

If your computer is definitely trying to boot from the correct hard drive, the next most likely cause of failure is that the boot sector is corrupt. Only a very small (if specific) amount of data needs to be damaged for this situation to arise, and in the vast majority of cases,

the rest of the information on the drive won't have been deleted at all; you just can't get to it if you can't boot into an operating system.

The quickest way to repair the boot sector is in the Windows Recovery Console. Boot from your Windows CD or rescue disk, enter the recovery console and enter the appropriate commands for your version of Windows. It'll probably be either 'fixboot' or 'fixmbr', so look those up and see which matches your particular installation. If successful, these commands write a new boot sector to the current system partition (which you will recognise as your 'C:' in Windows). You then only need to remove the Windows boot disc and use the command 'exit' to restart your machine, at which point Windows should restart normally.

Beware that, if you have more than one operating system installed and in use, the fixboot/fixmbr command will probably render them inaccessible – but then if you're the kind of person running a dual boot, you probably know that already. For most users, this limitation won't be a concern.

If these attempts fail, there's a chance that the data on the disc been wiped or lost, but even that isn't the last word. An undelete program may be able to recover some or all of the data that was stored on it, but since the undelete process is lengthy and requires the use of third-party software, it makes most sense to do it from a Windows environment. Try booting your operating system off a CD or thumbdrive, and you should then be able to access the disk without writing data to it. Once you've recovered your files, you'll probably have to reinstall Windows, but at least your system is working again!

Ultimately, repairing a broken PC is a potentially rewarding experience that, among other things, has the ability to teach you a lot about what's going on behind those loading screens and start-up messages. Take things slow, and keep in mind that there's no such thing as an unrecoverable error. Only a hard drive crash can really destroy your data, and those are comparatively rare occurrences. Anything else is just an obstacle to overcome, and as long as you pay attention to the error messages you see and proceed in a logical manner, it's almost always possible to bring your computer back from the brink. And once you do, every time you hit the power button and your computer starts up normally, you'll feel all the more grateful for it. [mm](#)

“ The problem might be that your PC is trying to boot from an inappropriate device ”



Ruark Audio R1 Mk3

Anthony checks out a DAB radio that refuses to be held back

DETAILS

- Price: £200
- Manufacturer: Ruark Audio
- Website: www.ruarkaudio.com

Digital audio broadcasting presents something of a problem for radio manufacturers releasing products in the UK. No matter how good their products are, no matter what features they include, they're still going to be hamstrung by the fact that we're using an old version of DAB, which provides lower-quality audio than FM radio. Meanwhile, many other countries are using DAB+, which can potentially provide much better sound, thanks to its more efficient codec (aacPlus, instead of MP2).

At the moment, there are no plans to switch over to DAB+ in the UK, so whether you spend a lot or a little on a digital radio, you're going to be limited to low-bitrate transmissions, which generally sound like someone talking through a Pringles tube.

Why, then, would you spend £200 on a DAB radio, like Ruark Audio is hoping you will? Well, for a start, it's fully compatible with DAB+, so you won't have to replace it, should that technology eventually be launched over here. However, that's a bit of a risk, considering the uncertainty around that issue.

What's more important about the R1 Mk3 is the fact that it's built to the same high standards that have attracted numerous awards for this company's products, including the previous incarnations of the R1. Finished in either black, white or 'Rich Walnut', it consists of a 17cm

tall box with a 3.5" loudspeaker in the middle, a display on the front, buttons and a dial on the front, and underneath you can find the recessed area of the bass reflex cabinet.

It's certainly not cheap, but this British-made radio oozes quality and, thankfully, that's more than skin deep. Yes, you're still limited by the DAB standard, but the R1 also functions as an FM radio and a Bluetooth speaker, and there's also a 3.5mm input at the back as well. You'll also find an extendable, detachable antenna back there, along with a headphone port and a USB port for charging mobile devices. Oh, and it also functions as an alarm clock, so you can wake up to your favourite One Direction songs (or, if you prefer, actual music).

It's these extra features that really make the R1 useful, especially the Bluetooth. The sound quality is top notch, with clear highs and distortion-free bass notes, even at

high volume. And if you're connected to a smartphone or tablet, you can use the R1 controls to skip tracks, as well as altering the volume. We also tested this feature with a Mac and Spotify, but the radio simply displayed the word 'unknown', rather than the name of the track and artist like it should have.

That might not be the case with all programs or operating systems, though and, to be honest, it didn't really bother us too much. Although the R1 works perfectly well as a speaker for a desktop PC or laptop, it seems to be primarily created as a portable device. That's particularly evident if you take into account the optional accessories that Ruark also sells. With the battery pack (£50) and the leather carry case (£40), you can easily stream music from a smartphone or tablet while out and about – and look good in the process.

No matter where you intend to use the R1, though, you're looking at a serious investment



here. It's not cheap, but it looks good, sounds fantastic and feels as if it's been built to last. Yes, it might cost a lot now, but if it lasts you ten years, rather than breaking and having to be replaced in one, then it's worth the cost. If you're looking for a well-made radio and speaker that you can take with you wherever you go, and you can afford something like this, then there's very little reason not to buy it.

mm Anthony Enticknap

Future-proof, and sounds as good as it looks



Withings Home

While he's away, Michael's cat becomes a video star

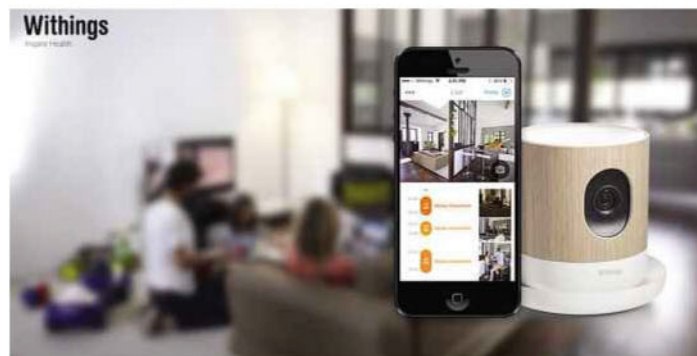
DETAILS

- Price: £169.05
- Manufacturer: Withings
- Website: www.withings.com
- Required spec: iOS 7 and later

The Withings Home is a smallish device designed to keep you advised as to what is happening in its immediate vicinity. With dimensions of 85 x 75mm, this cylindrical-shaped device can connect to a home network and communicate updates to an Apple smartphone or tablet via a downloadable app. Currently, Android and web-based apps are under development to help widen the Home's sphere of influence.

The Home device, which sits in a Frisbee shaped smoky-white table stand, features a 5MP IP camera with a 135° wide angle lens and 12x zoom capability. Also built into the device are two digital microphones with echo cancelling and noise reduction, plus a speaker and sensors for detecting motion, ambient light and VOCs (Volatile Organic Compounds) when checking on the air quality. There are also magnets allowing the unit to be positioned at different angles within its stand.

The translucent base of the Home device can be illuminated in different coloured lights to provide status feedback. Covering the top section of the Home device is a cover, which is removable. By default,



the cover is decorated as European White Oak. When necessary the cover can be slid around to block the camera if privacy is required. Located at the rear of the unit are sockets for recessed micro-USB mains power, standard USB and Ethernet ports.

Setting up this product requires a free password-protected Withings account that can be created using the iOS app. Following the establishment of a Bluetooth connection, you will need to link the Home unit to your home network. While this can be achieved via the Ethernet port, I opted for the wi-fi option. This brings into play the Home's Quick Setup procedure, which does all the work for you. This procedure shares your wi-fi settings that

are stored on the connected iOS device.

Especially useful, if you have more than one unit, is the ability to give each one an appropriate name, such as Living Room or Nursery. You can also turn off the individual notification options for motion, sound and air quality. However, this adjustment is all-or-nothing, as you cannot make slight adjustments to these options.

The Withings Home allows you to switch between Live/ Diary and Photo Album views of its detection features. As its title implies, the Live/ Diary view combines a live stream of video action with a diary showing a timeline of detected events classified as motion or noise and time stamped. By double-tapping

on a timeline entry you can replay the action, delete it or share with others via messaging, email, AirDrop or iCloud Photo Sharing. A similar double-tap on the live stream enlarges it to full screen size and gives you access to a Lullaby feature, as a tune is played for a user-specified time in baby monitor mode and gives you the opportunity to communicate with those within range of the Home unit.

Along with detecting events and sending out notifications by the handful via Push technology, the Withings Home takes a photo of each detected event and stores them in a Photo Album. These photos can be shared, copied or printed.

The Withings product also checks on the air quality by detecting VOCs. In order to carry out this task, a 48-hour test will need to be run to help calibrate the accuracy of the collected data. This product does not include the detection of carbon monoxide in its remit.

mm Michael Fereday

This product serves best as a baby minder



HP Envy 360x 15-u000na

HP aims to make other hybrid computer makers envious with its x360 systems

DETAILS

- Price: £649
- Manufacturer: HP
- Website: www.hp.com

In the past few months, HP has launched a series of products all labelled 'x360', which feature a hinge that allows them to transform from laptop to tablet and a few modes in between.

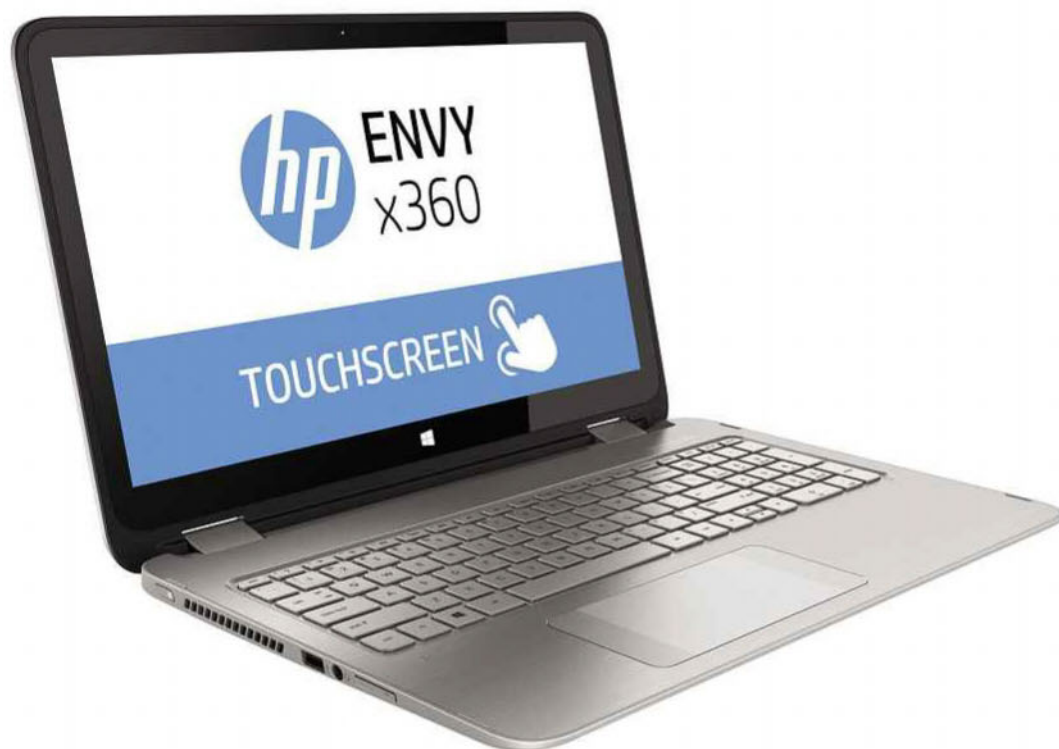
The Envy x360 is one of the physically larger models of this product range, featuring a full 15.6" ten-point touch display. The review model came with a Core i5 4210u CPU, 1TB hard drive and 8GB of RAM. HP also offers variants with more modern Core i5 and also Core i7 processors if you need that power.

They're all designed for those who really only have access to one PC and need something powerful enough to do most things, while offering a degree of portability.

I say 'a degree' because at 2.4kgs I'm not sure you'd want to carry this for extended periods or use it in tablet mode unsupported.

But before I get more critical, there are some things about this design that HP definitely got right in this highly engineered hybrid PC.

Opening the Envy x360 for the first time, the keyboard is surrounded by a cool metal surface that won't collect fingerprints, and the ample space allowed by the corresponding screen size is well utilised by a large touch sensor pad.



This machine also has an excellent collection of ports that include three full-sized USB, two of which are USB 3.0 spec. It also has an SD card reader, a gigabit LAN port, HDMI out and both in

made more game friendly if you nail the image quality settings down.

However, battery life isn't great, with it being estimated at three hours and 32 minutes by PCMark08 running a

washed out and the viewing angles generally poor. Given the very clever hinge design, you can place the screen at all manner of angles, the majority of which won't work well to read this screen. Oddly, the best viewing angle is about 45 degrees – greater than most people would normally choose.

The screen is one weakness, and another is the keyboard. The size and spacing is fine, but the travel doesn't conclusively end with a definitive click, making it difficult to type quickly. I'm not sure I'd want to type anything substantial on this, though experience tells me that I could probably adapt to it over time.

Hardware is therefore something of a mixed bag, but the Envy x360 also has some software issues.

“ The screen is one weakness, and another is the keyboard ”

and out audio jacks. I was mildly disappointed that the wi-fi is only N class, not AC, but the Bluetooth 4.0 is at least Miracast compliant.

Overall processor performance is good, and while it's not anything special, the integrated GPU can be

home test. With less 3D graphics, four hours is probably realistic.

Battery life is not my biggest complaint, though. That nomination goes to the screen. The resolution is an acceptable but modest 1366 x 768, but the colours are

Looking at what came pre-installed, HP is still entrenched in the same mindset that got Lenovo into so much trouble recently in regards to bundled applications. While the storage on this machine is big enough that the space occupied isn't a deal-breaker, the time taken to de-gunk the PC most certainly is.

HP contributed no less than nine of its own superfluous apps, and

preinstalled 18 others, including the seemingly endemic McAfee LiveSafe.

Please, HP, stop doing this, as it undermines all the hard work your hardware engineers put in to make this computer nice. It's like Jaguar made a classic sports coupe and then had some idiot brush paint it in old camouflage colours. Just stop it now, because rest assured that your customers hate it.



Crapware aside, this is an average machine at a reasonable cost for the specification, and one that many people could feasibly make good use.

However, its weight, the quality of the screen and the keyboard, and a few other niggles tend to undermine what initially seemed much more desirable. I predict the next Envy 360x release will be great, but the current one is quite rough around the edges.

That's a real shame, because in other respects the Envy x360 is a decent laptop, even if the tablet side of its persona seems much less convincing.

And that's the rub really, because why invest in a hybrid machine that ends up being used exclusively as a laptop? Unless Microsoft can turn around the tablet side of Windows, then you'd be better off investing in straight laptop.

If you're still interested in this concept, HP has a 15-u205na model that's cheaper than the review hardware by £50, has a faster i5-5200U CPU, a 1080p display and a 500GB hybrid hard drive that probably represents a much better deal.

mm Mark Pickavance

Let down by a poor screen and tablet ambitions



Benq RL2755HM

Need more control over your gaming display? Look no further

DETAILS

- Price: £209.99
- Manufacturer: Benq
- Website: goo.gl/UP8EyO
- Required spec: HDMI, VGA or DVI connection

The Benq RL2755HM has been engineered for gamers, to get the best possible resolution and refresh rates while offering one or two other subtle extras to help the gamer enjoy the experience more.

The full HD TN panel measures 27 inches and offers a 1ms response time, brightness levels of 300cd/m² and viewing angles of 170° horizontal and 160° vertical. Connectivity comes in the form of two HDMI ports, DVI and VGA, as well as a headphone and line in ports for the pair of 2W speakers.

The matt-black finish limits the amount of glare and fingerprints and is coloured with splashes of red here and there for a more pleasing effect. It's fairly basic, but there's nothing to distract you away from the action on the screen. Incidentally, the base is angled slightly, with a rubberised strip at the top to rest one or more controllers on and around the back of the screen there's a flip-down section to store your headset. Little details, yes, but significant.

The proof, though, is in the testing. And happily the RL2755HM didn't disappoint. There was no perceivable lag, motion blur or anything usually associated with a monitor lacking in fast action response timings. Any genre of game or fast action movie will look

▲ The Benq RL2755HM is a great 27" monitor



▲ With a few extras included as a nod to the gaming fraternity



great when played on this monitor, but Benq has also included a couple of dedicated gaming profile picture modes, for first-person shooters and fighting games. These settings will alter the calibration of the colours and improve the sharpness of the screen to help you see more during play.

On top of this there's also a Black eQualizer mode to

brighten darker scenes without overexposure, and there's a 20-Level Colour Vibrance setting to help optimise the details on screen.

Out of the box, this screen looks perfectly fine. In fact, it's one of the best, most colour rich and sharp we've seen in a long time. However, there are a few elements we would have liked to see added. For one,

there's no USB connectivity. It's a minor detail, but since this is a gaming monitor, the addition of a couple of USB ports (just for charging wireless controllers perhaps) would have sweetened the deal. Secondly, there's no DisplayPort connection. Again, you could argue that it's not necessary, since there's already a pair of HDMI ports, but a lot of graphics cards are now pushing finer details through DisplayPort, and there's always an opening there to accommodate Nvidia G-Sync technology. And finally, it's not the most ergonomic of monitors in that there's only a slight tilt available. If perhaps a height adjustment could be added, for better positioning, then again this would make the monitor stand out.

These are very minor gripes, though, and it's the better than normal level of user control that really sets this monitor apart from other 27" models. For the price, this is a very good monitor on its own, regardless of its suitability for gaming. Hook it up to a console or your gaming PC, and you're certainly in for a treat.

mm David Hayward

A fantastic gaming monitor, with lots of user control





Quiet PC Mono All-in-one

Striking looks and great hardware, all from a single monitor chassis

DETAILS

- Price: From £689
- Manufacturer: Quiet PC
- Website: goo.gl/2LajYG
- Required spec: Keyboard, mouse, power



The all-in-one machines we've tested in the past have been ARM-based, Android-driven systems, which although good are a somewhat limited when compared to 'proper' PCs. Plus they're really nothing more than giant, glorified tablets.

We were therefore looking forward to getting our hands on the latest Mono all-in-one unit from Quiet PC, a system that boasts proper PC innards without compromising on style or functionality.

The Mono AIO is an exceptionally neat system built around the Mono chassis, into which you can fit conventional PC components, including high-end graphics cards. The chassis comes in three sizes (21", 23.6" and 27"), with each having a 1080 HD TN panel with a dynamic contrast ratio of 20,000,000:1 and a contrast ratio of 1000:1, with a response time of 5ms for the 21" and 23.6" models and 3.4ms for the 27" version.

The rear of the screen, however, is where the magic takes place. Behind the panel you'll find a vented plastic cover, where you can fit a mini-ITX motherboard complete with PSU, storage and graphics card. The 23.6" model we have to test featured a Gigabyte GA-H97N-WIFI motherboard, with an Intel Core i3-4360 3.7GHz processor, and 8GB of Crucial memory driving a choice of operating

systems from Ubuntu to Windows 8.1 Pro.

As well as that, Quiet PC has also included a Sapphire AMD R7 250 Ultimate Edition fanless 1GB GDDR5 graphics card, a 250GB Samsung 850 EVO SSD, and an FSP 500W 80+ PSU. The result is a perfectly capable system, which scores 2,097 in the 3DMark benchmark and 4,106 in PCMark 8.

The performance of the machine is certainly more than adequate for everyday computing and, to some extent, a spot of gaming. But it's the quality of this system that makes it stand out from the crowd.

The design is very Apple-like in its approach, with a high-quality screen mounted on a stark white bezel that cunningly hides the controls for brightness, PC power and a pair of 3W stereo speakers. There's even an extra USB port tucked into one corner of the screen and room for a slimline optical drive. The stand has minimal tilt and no height adjustment unfortunately, but it's raised enough to be

comfortable when sat in front of you on your desk.

The PC components around the back of the screen are whisper quiet. Even with your ear pressed firmly against the plastic housing, you can barely hear anything from inside the well ventilated area. Speaking of which, it's also a remarkably cool running PC. After running through the various benchmarks, there was very little heat being pushed out from the rear of the unit – unlike some all-in-one machines we've tested in the past, which felt like there was a hairdryer running behind the screen.

The quality of the screen is excellent, displaying a rich blend of deep colours and enough brightness to distinguish images and text clearly with a higher than average level of clarity. However, should you require more monitor coverage, then the beauty of this setup is that you can easily add another one or two screens through the graphics card's connections. In most cases the HDMI port is fed through

to the screen, leaving the other connections, extra HDMI or DisplayPort free to hook up to an extra monitor.

Using the Mono AIO makes you forget that underneath everything is still a traditional PC, so it can be upgraded and tweaked. As long as a new graphics card or extra hard drive can fit into the housing without compromising the cooling, then you can expand the system.

It's a stylish setup, and if you include the Microsoft Wireless 3000 keyboard and mouse kit as well, then you'll have a matching set of black-and-white peripherals with the Mono AIO. Naturally, you can opt to configure different components from the Quiet PC Mono all-in-one site. With prices starting from just £689 and rising to well over £2,000 with virtually every option added, the Mono AIO system can cover a vast range of user's needs.

We liked the Quiet PC Mono all-in-one. There's enough power from the base system to enjoy gaming, as well as contend with everyday duties, and it's an excellent looking machine as well. An interesting and well-designed system that's worth every penny.

mm David Hayward

Stylish and capable, with a great screen and exceptional design



Movavi Video Editor

Roland Waddilove sits in the director's chair and creates his own movie with a budget editing package

DETAILS

- Price: £24.95
- Manufacturer: Movavi
- Website: movavi.com
- Required spec: Windows XP or later, 1GB RAM, 1GHz CPU, 250MB disk space

The low price of this software puts it firmly in the home user hobbyist arena. It's not a professional tool for editing your next TV documentary or Hollywood blockbuster. But although it's cheap, it has a lot of useful features, and it's great for editing your holiday, wedding, birthday or other videos you may have taken on your mobile phone or digital camera.

The interface looks modern and is packed with tools and features, but once you start using it, it's not obvious how to perform some actions. It takes time to discover how to use it, and you'll need the online tutorials and manuals to learn how it works. Once you get to grips with it and become familiar with the tools, though, it's a lot of fun.

There are Import, Media, Effects, Fades, Titles and Save Movie tabs, and this is exactly the order in which a video is created. All your video clips and photos for a project can be imported, and all the common file formats are supported. Video and audio can also be recorded directly if you have a webcam, as laptops do these days. Then you switch to the Media tab and drag and drop them into the timeline. Multiple video, audio and titles tracks can



▲ There are over 100 special effects, titles and transitions to enhance your movie

be used, and items can be dragged and dropped to move them or insert them.

Video stabilisation is available, and this is

and you have to delete the original and then drag the new version to the timeline and insert it. It worked well, though.

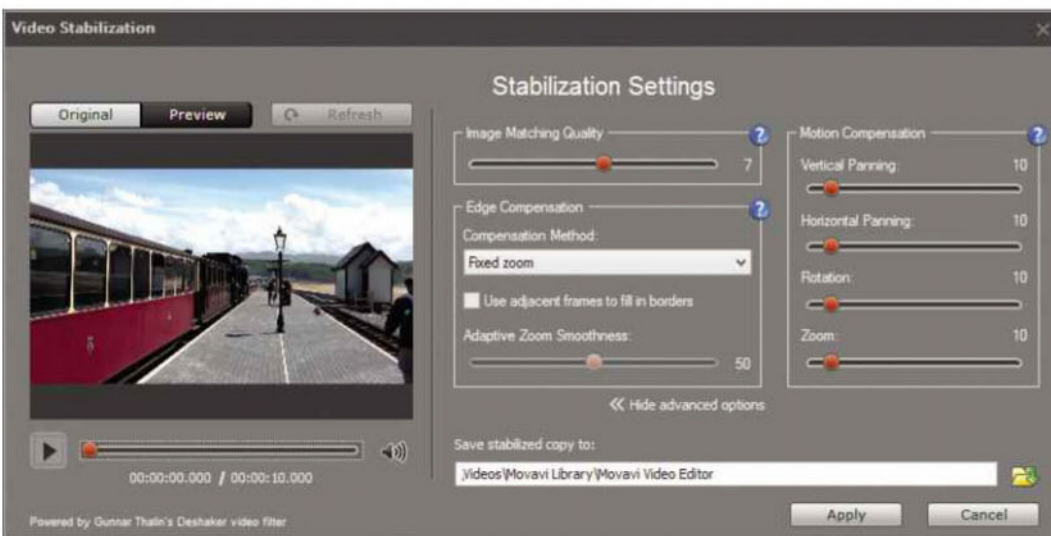
is flying objects. There are hearts, bunnies, paper planes, ghosts, snow, leaves and many more. These are cartoon-like objects that are animated and float across the video. Another great effect is picture-in-picture. While one video is playing, you can have a second one playing in the corner of the screen or wherever you want it. There's a miniatures effect that applies special effects to create the impression of miniaturisation. It's weird but fun.

There's the usual collection of transitions to insert between scenes, and they're easily adjusted. Titles can be added, and there are many options, such as fade in or out, bounce, gravity

“ A comprehensive home video editor that has an excellent range of effects ”

great for smoothing out handheld video clips. A shot walking along that made people seasick watching it was so much better after stabilisation. It was confusing at first, because the stabilised video was saved as a new clip

The Effects tab provides access to more than 100 effects, and more packs can be purchased online. There's noise, artistic, blur, chroma key, filters, mosaic and many more. One of the more interesting ones



▲ Share your movies online or save them to disk in a wide range of formats

◀ A stabilisation tool makes your hand-held wobbly shots rock steady.

Decent video editing and an amazing price



and a Star Wars into-the-screen scrolling effect. The Save Movie options are comprehensive, and there are presets for a large number of phones and tablets, YouTube,

Facebook and Vimeo uploads, raw uncompressed video, HD 1920 x 1080 video and so on. You can even save 3D movies.

Movavi is a comprehensive home video editor that has

an excellent range of effects and features. It's reasonably priced, and once you get used to it, it's straightforward to use.

mm Roland Waddilove

GROUP TEST

Gaming Motherboard Bundles

Building a gaming PC these days can be a little confusing, especially if you've been out of the loop for a little while. There appear to be countless CPU, motherboard, memory and cooling options available, some which will work with one thing but not another.

A gaming bundle consisting of motherboard, CPU, cooler and more can help take away some of that stress, and you often get a better deal too.

David Hayward been looking at six bundles this week, to see which will keep you glued to your favourite game for hours.

Gaming Motherboard Bundles

OC Recon Anniversary Intel Bundle

DETAILS

- Price: £210
- Sold by: Overclockers
- Website: goo.gl/1rY84I
- Required spec: PSU, case, hard drive, OS

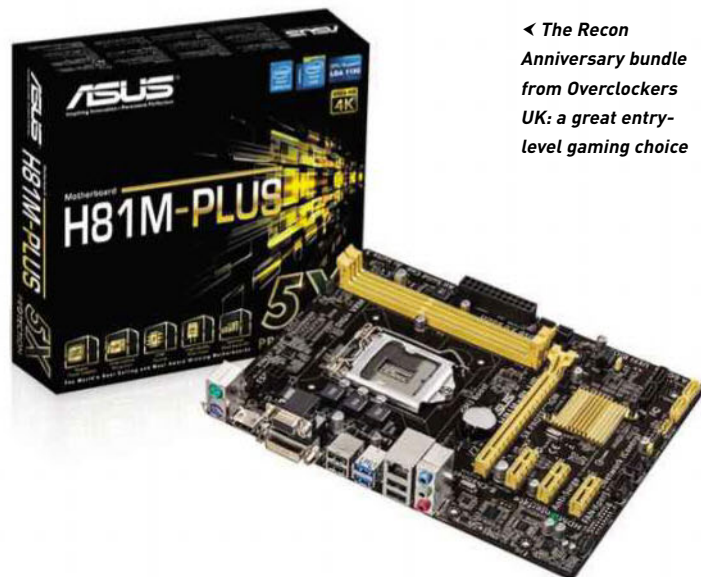
Overclockers UK has a range of gaming motherboard bundles available. The Recon Anniversary Intel bundle is the cheapest from the range (at present), but don't let the price fool you into thinking corners have been cut.

The bundle is certainly good enough for the modest gamer on a budget. It features an Asus H81M-Plus Intel motherboard, an Intel Pentium K Anniversary Edition G3258 processor overclocked to a decent 4.2GHz, 8GB (2 x 4GB) Kingston HyperX 1866MHz memory and a Prolimatech 68 CPU cooler.

To begin with, the Asus H81M-Plus is a micro-ATX board for Socket 1150, fourth-generation processors. There are a pair of DIMM slots for a maximum of 16GB, a single PCIe x16 expansion slot and three PCIe 2.0 x1 slots. The back IO ports consist of two PS/2, DVI, HDMI, VGA, gigabit Ethernet, two USB 3.0, four USB 2.0 and three audio jacks.

Although there's no support for CrossFire or SLI, this budget motherboard is quite capable of powering a decent GPU, while still being a good, stable workhorse for more everyday duties. Overclocking in this respect is good too, and the new looking UEFI is easy to use and makes slight changes to the system speeds a doddle.

The Haswell dual-core Pentium G3258, also known as the Pentium-K, features an unlocked multiplier that can provide a stable



◀ The Recon Anniversary bundle from Overclockers UK: a great entry-level gaming choice

overclocking speed of up to 4.8GHz – there are even some examples of it going higher.

It's not the greatest performing CPU, though (after all, it is a budget level processor), but with a base clock of 3.2GHz, 3MB of L3 cache and a TDP of just 53W, it's a good start for more casual gamers. The CPU has a HD4000 GPU, which obviously won't offer the best frames per second in the latest games, but it'll take on older games at higher resolutions quite happily. It's worth noting that HD video playback won't be an issue with this chip.

Ultimately, what really matters here is the overclocking potential of this processor and the fact that you can have a lot of fun tweaking it to its limits.

Using the Kingston HyperX 1866MHz 8GB set may seem a little extreme, considering the entry-level appearance of everything else so far, but it represents a considerable boost in performance for both gaming and other duties – enough that without it you'd certainly notice the difference.

The final component in the bundle, the CPU cooler, is another good choice from Overclockers.

Rather than opting for a more inferior stock-like cooler, instead the Prolimatech 68 has four high-quality heat pipes and a 120mm fan housed in a reasonably thin profile. This is especially good, since the H81M-Plus board is so small, and things can get begin to feel a little cramped once fitted inside a case. At least with the thin profile of the cooler, you could always opt for RAM with bigger heatsinks without fear of components touching.

Overall, the Recon Anniversary bundle from Overclockers is a great choice for the entry-level gamer. It's reasonably priced at £210, and it'll play a good selection of titles at higher resolutions, as well as being suitable for a capable media centre with extras.



Scan MSI Z97 Gaming 5 Bundle

DETAILS

- Price: £378.68
- Sold by: Scan Computers
- Website: goo.gl/lkFrux
- Required spec: PSU, case, hard drive, RAM, OS

Scan has an interesting gaming bundle on offer consisting of an MSI Z97 Gaming 5 motherboard and an Intel Core i7-4790K CPU. But is this a setup worth spending your hard-earned pounds on?

The MSI Z97 Gaming 5 is an immensely stylish and capable ATX, LGA 1150 motherboard. It has four DDR3 DIMM slots for a maximum of 32GB of overclocked 3300MHz memory, three PCIe x16 slots, four PCIe x1 slots and an M.2 port. The rear IO consists of a gigabit Ethernet port, four USB 3.0, four USB 2.0, VGA, DVI, HDMI and six audio jacks.

The dominating flashes of red on this imposing black motherboard are impressive, to say the least. More importantly, though, under all that style is the fact that MSI uses the best possible components when manufacturing its range of motherboards – even more so for its gaming boards. On the Z97 Gaming 5 you'll find an isolated audio PCB, a dedicated Creative Sound Blaster Cinema 2 processor, military class 4 components for stable overclocking, circuit protection and a host of other tantalising features.

The processor used in this bundle is the equally good Haswell-based Intel i7-4790K. This quad-core, eight-thread unlocked processor has a core clock speed of 4GHz, with a



▲ The MSI Z97 Gaming 5 motherboard is an impressive piece of technology



▲ Combined with the i7-4790K, this makes for a serious gaming PC

“Advanced gamers will certainly appreciate the motherboard and processor”

boost to 4.4GHz and an L3 cache of 8MB. Overclocking is good too, with some enthusiasts getting a stable 4.9GHz with standard cooling and going higher on more specialist coolers and PSUs.

Although the combination of motherboard and processor

are indeed enough to raise an eyebrow or two, the entire bundle is a little sparse on other elements. As you can well see, there's no memory included or a CPU cooler for that matter. Perhaps if Scan was to throw in 8GB of RAM, or even some other component

of a gaming nature, it would make the £378.68 cost a little easier to take.

On the other hand, if you're willing to factor in the cost of memory and CPU cooler, then you'll have a powerful combination that will offer you some great gaming visuals. And if money is no object, then consider a three-way SLI or CrossFire setup on the MSI Z97 Gaming 5 board.

Advanced gamers will certainly appreciate the motherboard and processor used here; the chances are they'll already have something in place to take care of cooling, memory and other factors. For the average gamer, though, this package is a little too expensive and lacking in extras. 'Future proofing' is a phrase that's easily bandied about, and it can be taken into consideration in this instance as well.

If you have a plan for a powerful gaming PC in mind, then this bundle will allow you to hit the ground running. The same applies if you're after a core system speed boost and the opportunity to add more components at a later date. However, as we said, entry-level gamers will get more for their money with some of the other many deals from the Scan pages.



Gaming Motherboard Bundles

OC GIGABYTE MAGMA Z97 BUNDLE

DETAILS

- Price: £575.99
- Sold by: Overclockers UK
- Website: goo.gl/c4Ne5q
- Required spec: PSU, case, hard drive, OS

▼ *This bundle is an overclocker's dream come true*



Our second Overclockers UK bundle represents a higher grade of components and features at, obviously, a higher price than the previous one. But what you get for your money makes this particular bundle stand out from the crowd.

The Overclockers UK Gigabyte Magma bundle consists of a Gigabyte Z97X-SOC Force motherboard, a choice of 8GB or 16GB TeamGroup Vulcan 2133MHz memory, an Intel Core i7-4790K Haswell Refresh CPU overclocked to 4.5GHz and a Prolimatech Genesis CPU cooler.

Starting with the motherboard, the Gigabyte Z97X-SOC Force is a singularly impressive overclocking enhanced board. It has four DDR3 DIMM slots for a maximum of 32GB, 3300MHz overclocked memory, two shared bandwidth PCIe x16 slots (dropping to x8 when both slots are occupied), two PCIe x4, a single PCIe x1 and two PCI slots. The rear IO has four USB 3.0 and four USB 2.0 ports, optical S/PDIF, VGA, HDMI, DVI, DisplayPort, one PS/2 port, six audio jacks and gigabit Ethernet.

Aside from the orange-on-black colouring of the motherboard, there's another element that stands out from the usual here in the form of a row of buttons located under the memory slots. The buttons are inherited from the

more extreme overclocking motherboards that tend to cater for those who use liquid nitrogen in great abundance. To give us mere mortals a taste of what the extreme users get up to and because the extreme overclocking motherboards don't sell as many as regular motherboards, Gigabyte has thrown in this extra feature.

The buttons offer the user a range of features, from providing power to the motherboard and connected components for testing outlandish cooling solutions or demonstrations, through to clearing the CMOS, one-button overclocking, disabling PCIe slots and other such adjustments. It's an overclocker's and system tinkerer's dream come true and along with higher grade capacitors and other military class PCB features, there's a lot to get your teeth into with this board.

Memory in this bundle comes as a choice of two

options. Here you can opt for 8GB of TeamGroup Vulcan 2400MHz RAM or for £39 more you can opt for 16GB of TeamGroup Vulcan 2133MHz RAM. Both options are orange dual stick kits, which match the orange on the Gigabyte Z97X-SOC nicely, and both are more than enough to cope with anything you can throw at them.

The final component in the bundle is the Prolimatech Genesis CPU cooler, another example of the overclocking fraternity this package is targeted for. The Genesis is an L-shaped design cooler that allows three 120mm or 140mm fans to be attached on the exposed surfaces. It has six copper heatpipes running through the aluminium fans and weighs a considerable 800g.

The Genesis does have a high clearance, but you'll still need to make sure other components beyond what you get in this bundle will fit when you come



to putting them into a case. In addition to the Genesis, you also get a pair of LED 120mm BitFenix fans, which naturally enhance the orange/black, extreme overclocking and gaming theme.

There's a reason why this bundle has 'Enthusiast' in the subtitle. It's not for those who simply want to play a spot of *Minecraft* every so often. Obviously, it's up to you whether you use the bundle for its overclocking options and features, but spending £575.99 to just leave everything running out of the box seems a bit of a waste.

This is an impressive bundle, designed for overclockers, system designers, enthusiast gamers and benchmarkers. It's expensive, but also rather well put together.

CCL Alpha Brilliant Bundle

DETAILS

- Price: £199.99
- Sold by: CCL Computers Ltd
- Website: goo.gl/TtwyTe
- Required spec: PSU, case, hard drive, OS

▼ *The Asus A88XM-E isn't the most powerful board available, but it's good enough for most users*



It's all fine and well having an extreme Intel-based, overclocked bundle to help drive your gaming to higher levels of performance, but what if you simply require an entry-level bundle that costs less than £200?

CCL may have the answer for you in the form of its Alpha Brilliant Motherboard Bundle. This package consists of an Asus A88XM-E motherboard, 8GB of Kingston 1600MHz ValueRAM and an AMD 3.6GHz A8-6600K CPU.

The Asus A88XM-E is an AMD FM2+ socket micro-ATX motherboard with two DDR3 DIMM slots for a maximum of 32GB, a single PCIe x16, PCIe x1, a standard PCI slot and six SATA connectors. The rear IO backplate houses two PS/2 ports, DVI, VGA, HDMI, gigabit Ethernet, two USB 3.0 and two USB 2.0 ports, along with three audio jacks.

The board itself is fairly basic and lacks some of the pizzazz and glamour of the more extreme examples we've so far had. However, that's not to say it lacks too much when it comes to casual gaming. Granted, you won't be running *GTA V* in 4K with blistering frame-rates, but on the other hand you'll get a decent motherboard that's ideal for a younger person's first gaming PC.

The quad-core AMD A8 processor is a surprisingly good unlocked APU. Various tests

and benchmarks have already proved you'll get a good frame-rate on medium settings in the likes of *Bioshock Infinite* and *Sleeping Dogs*, considering its budget heritage. It's also worth noting that although you won't be enjoying the highest gaming frame-rates or scoring the best benchmark scores with this CPU and motherboard package, HD video will play perfectly well.

Overclocking should yield a top speed of around 4GHz with the Asus motherboard, but you'll need to make sure you have decent cooling in place. Either way, you'll get more megahertz for your money if you're willing to play around.

If overclocking isn't your thing (which it isn't to a lot of users), then for just £199.99,

the Alpha Brilliant bundle from CCL is a decent enough choice. The RAM is certainly ample for the motherboard and processor, and offers a good boost in performance at this level. And the entire package is cheap enough to consider adding a dedicated GPU, which will naturally improve the gaming potential further.

The lack of a cooler is a tad annoying, as you'll need to stick with the stock unit. The addition of a slightly better cooler, even a cheaper model can yield some good results and would make for a more attractive bundle. On the whole, though, it's good enough for entry-level gamers.

Although the CCL Alpha Bundle isn't the most extreme or powerful of the group, it



▲ *The AMD A8-6600K does a surprisingly good job of being a gaming CPU*

does a good enough job at an affordable price. It's ideal, we think, for a younger gamer or those who occasionally dip their toes in the gaming world.



Gaming Motherboard Bundles

Palicomp Overclocked i7 Ranger Bundle

DETAILS

- Price: £399.99
- Sold by: Palicomp
- Website: goo.gl/gDiqts
- Required spec: PSU, case, hard drive, RAM, OS

Moving back up the price scale, we have this intriguing configurable bundle from Palicomp, which can range from the base price of £399.99 through to an eye-watering £928.98.

The bundle consists of an Asus Maximus VII Ranger motherboard, an Intel Haswell Core i7 4790K processor overclocked to 4.4GHz, a ThermalTake Contac21 High Performance Ultra silent cooler and the option to add from 4GB of Crucial 1333MHz memory through to 32GB of Corsair Vengeance Pro 2133MHz RAM.

The Asus Maximus VII Ranger may well be classed as a high-value entry-level motherboard, but it's one that seems to tick all the right boxes. There's support for the fourth- and fifth-generation Intel Core CPUs and the impressive Z97 chipset. There are four DIMM slots for a maximum of 32GB of DDR3, a pair of PCIe x16 slots for CrossFire/SLI support, along with a further three PCIe 2.0 x1 slots and M.2 support.

On the IO backplate, you'll find HDMI, VGA and DVI ports, gigabit Ethernet, four USB 3.0 ports, two USB 2.0 ports, optical S/PDIF, a pair of PS/2 ports, six audio jacks and a BIOS FlashBack button to factory reset everything should your overclocking go a little awry and become drastically unstable.



▲ The Ranger bundle from Palicomp is a great for gamers



▲ The ThermalTake Contac21 is an idea cooler for a spot of overclocking

The overclocking potential for this board is fantastic, but it also has a range of other gaming features, such as network optimisation, gaming level audio and a special KeyBot on-board chip that will turn any keyboard into a macro-laden gaming weapon. It's definitely one worth looking into for your next upgrade.

As the 4790K is overclocked out of the box in this bundle, Palicomp has included a decent cooler to help keep things as stable as possible. The ThermalTake Contac21 has four 6mm diameter copper pipes running through its ample aluminium frame, along with a 92mm fan installed on one side (with the option to

fit another on the opposite side). It's quite tall, measuring 139.5mm, which makes it an excellent cooler but one you may have to measure for your case before committing to buy.

The final part of the bundle is the optional memory, which can add from £30 to £275 to the overall cost. Naturally, the more you spend, the faster and more capable the memory becomes, but for the sake of keeping the price below the £1,000 mark, the option of 8GB 2133MHz Crucial Vengeance Pro RAM will offer an excellent compromise between price and performance for most gamers.

It's worth mentioning here that the memory isn't the only configurable option. You can also choose from a selection of Intel motherboards, the maximum overclocking speed and the type of CPU cooler as well. There are some good options here, and you can ultimately fine tune your gaming bundle to how you see fit.

Based on this specification, with the 8GB of Crucial Vengeance Pro 2133MHz memory, the bundle comes in at £479, which isn't too bad considering the performance of the system you're buying.

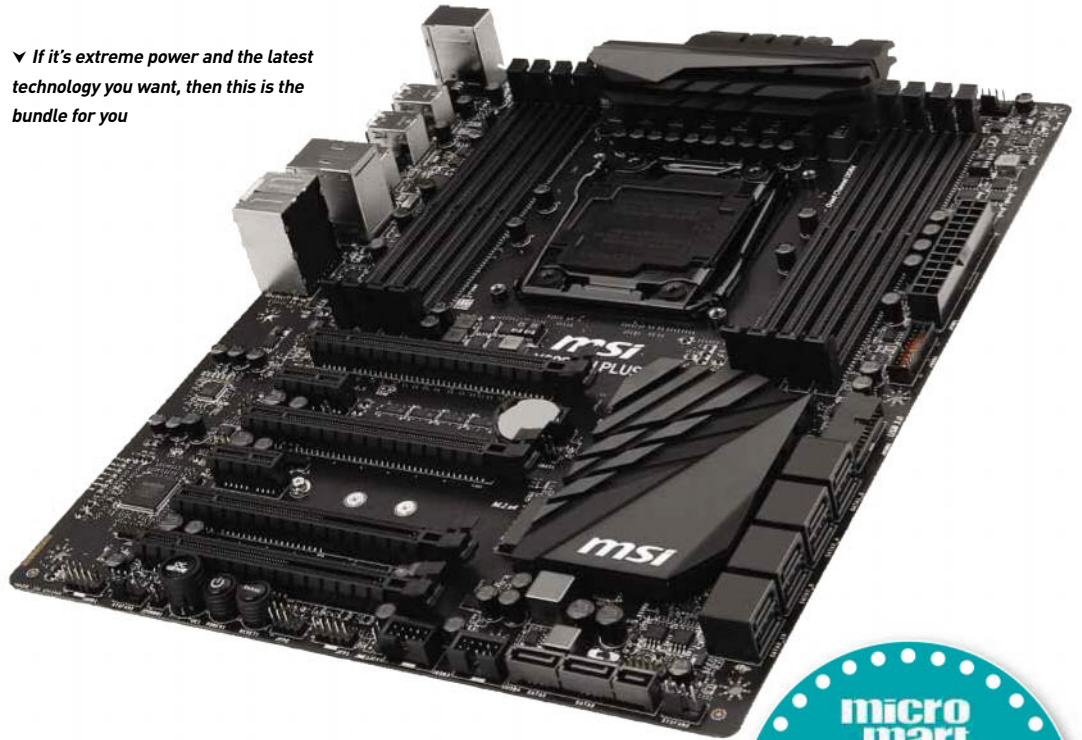


OC Breeze MSI X99 Bundle

DETAILS

- Price: £815.99
- Sold by: Overclockers UK
- Website: goo.gl/v317gl
- Required spec: PSU, case, hard drive, GPU, OS

▼ *If it's extreme power and the latest technology you want, then this is the bundle for you*



We're back with Overclockers UK for this final entry in the group, and it's a doozy, as they on the other side on the Atlantic.

The Overclockers Breeze MSI X99 bundle comes in at a wallet-emptying £815.99, but for that you get an MSI X99S SLI Plus DDR4 motherboard, an Intel i7-5820K CPU overclocked to 3.8GHz, 16GB (four 4GB sticks) of 2400MHz TeamGroup Elite RAM and a Prolimatech Blue Series Armageddon Cooler.

First the motherboard. This is one we reviewed a few months ago, and it's as impressive now as it was back then. Supporting the new Core i7 Extreme Edition processors, this LGA 2011-3 socket board is quite a dominating thing to behold. There are four 16x PCI-E slots, supporting quad SLI or CrossFire setups, eight banks of DDR4-3333 (OC) memory up to 128GB in quad-channel mode and SATA Express (SATAe) connectors for the new generation of SSDs that can churn out an eye-watering 10Gbps transfer rates. And these are just the tip of the iceberg here.

The design of the board is black throughout, with angled and futuristic VRM and PCH heatsinks, Super Ferrite Chokes and aluminium solid capacitors, this ATX board wouldn't look out of place in the Batmobile, let alone a side-windowed case. On the IO backplate you'll find eight USB 3.0 ports, two USB

“ It features the latest hardware in a neatly packaged bundle ”

2.0 ports, optical S/PDIF, five audio jacks, gigabit Ethernet and a single PS/2 port. It's worth noting at this point that you'll need a separate GPU, as there aren't any video out ports on the rear of this board.

The Intel i7-5820K is a six-core, 12-thread Haswell-E processor running at 3.8GHz, 600MHz up from its stock speed. It has an impressive 15MB Intel Smart Cache and a TDP of 140W. It's a highly regarded processor from Intel, but it does have one limitation that makes it an odd choice for a gaming bundle.

Although good, the 5830K only supports 28 PCI Express

lanes, which limits it when you start to look into a multiple GPU setup. Its sibling processors, the 5930K and the flagship Intel Haswell-E model, the 5960X, both cater for 40 PCI Express lanes. Mind you, they're also considerably more expensive and will undoubtedly put the final cost well over the £1,000 mark.

The TeamGroup Elite RAM makes good use of the DDR4 technology on the MSI X99S Plus; it's fast, and it's also the black edition, which looks pretty amazing when plugged into the equally imposing X99S.

The final component, the ProlimaTech Blue Series

Armageddon, is a towering monstrosity with six high-performance heatpipes spreading through its black aluminium fans, with a splash of blue colouring for extra effect – along with a 120mm blue and black themed fan. Although big, it must be said, the Armageddon cooler is surprisingly thin and measures just 144 x 50 x 160mm.

This is quite an extreme setup, and it features the latest hardware in a neatly packaged bundle. But bear in mind you'll also need to factor in a dedicated GPU and, in all honesty, it's going to have to be a good one to complement the rest of the hardware.





OC Recon Anniversary Intel Bundle

Although this bundle isn't the most powerful in the group, there was something about it that made it feel more universal.

Entry-level gamers can get some great results out of the box with this bundle, and more advanced users can add a decent GPU to get even better results. All for a mere £210 as well.



CCL Alpha Brilliant Bundle

Much like this week's winner, the CCL Alpha Brilliant bundle does an excellent job of providing a solid foundation on which to upgrade and build a more powerful gaming PC as the user sees fit.

Out of the box, it's more than adequate for most casual gamers, and with a few tweaks it'll happily tackle the more demanding titles available these days.

How We Tested

Each bundle was tested and assembled with an Antec 750W PSU, a 120GB SSD and, where necessary, with a GTX 970.

	OC Recon Anniversary Intel Bundle	Scan MSI Z97 Gaming 5 bundle	OC Gigabyte Magma Z97 Bundle	CCL Alpha Brilliant Bundle	Palicomp Overclocked i7 Ranger Bundle	OC Breeze MSI X99 Bundle
Price	£210	£378.68	£575.99	£199.99	£399.99	£815.99
Seller	Overclockers	Scan	Overclockers	CCL	Palicomp	Overclockers
Platform	Intel	Intel	Intel	AMD	Intel	Intel
CPU GHz	4.2GHz	4GHz	4.5GHz	3.6GHz	4.4GHz max	3.80GHz
Amount RAM	8GB base	None supplied	8GB	8GB	None supplied	16GB
Type Of Cooler	Prolimatech68 cooler	Stock Intel	Prolimatech Genesis cooler	Stock AMD	ThermalTake Contac21	Prolimatech Blue series Armageddon CPU Cooler
Optional Upgrades	Build time, delivery	Finance, delivery	Memory upgrade, delivery	CPU, memory, motherboard, care pack	Motherboard, CPU overclocking, RAM, Cooler and Delivery	Delivery
Extra Needed (Beyond PSU/Case/HDD)	None	RAM	None	None	Need to select RAM	Graphics card needed

Your Letters

Why Don't You Like ME?

Having just found your weekly magazine sitting on the shelf in my local newsagents a few weeks ago I am now hooked and can't wait till it arrives on Thursday mornings. I couldn't agree more with John Todd, in his letter in this weeks issue. I thought about writing in last week to ask you guys the same question: What was wrong with WinME?

I used WindowsME for a while before switching to WindowsXP, just at the end of my 'high school years'. To me WindowsME was great! It booted about 30 seconds faster than Windows98SE, It hardly ever crashed with a 'BSoD', I remember fondly of how I would make it look like WindowsXP when all the beta's came out, Windows Blinds Skins featured heavily on my system. It still hardly ever crashed, with the resource hungry program that is Windows Blinds.

WindowsME would happily except my brand new out of box CD-RW drive, my new massive 80GB HDD (that I thought I never fill, how wrong I was).

I have many fond computing memories of my time with WindowsME and never understood why people complained about it. My fellow 'geeky' friends would all snigger at me when I said 'I use ME'.

The enemy to me was Windows98/SE. I remember sitting after a system crash waiting for Windows 98 to install, it calculated the time at 238 minutes, it wasn't wrong, almost four hours later and I still didn't have stable system to use! I switched back to Windows 95C (you know, the one with USB Support written across the CD), which to me was much more stable than Windows 98 ever was!

WindowsME might of been a commercial failure to Microsoft, but for me it worked great. It will always remain in my computer memories as better than 98SE.

As John Todd has asked 'What was so terrible about it?'

Giles Cotterill

Online Voting

So the general election is nearly with us, and as I write this, I have just a few days till I'm due to go vote down at the local infant school. It's not too far away, but you know what? I still wouldn't mind being able to do it online. We can do just about everything else on the internet, including paying income tax, so why can't we vote? How much different would it be than postal voting?

'It's insecure', you might say. 'It's open to fraud, you may declare'. 'Poppycock!' I reply. There's no reason why the government couldn't send out unique codes to voters instead of postal voting forms. Then you'd just need to put that code into a special website, where it would be 'ticked off' a list, so it couldn't be used more than once.

It's simple, so why doesn't this exist? I can think of a few reasons. One, it would cost money to set up, and that's valuable cash that could be better spent on MPs' expenses, so they can build nice houses for the ducks in their private ponds. Also, it might mean that more working class people would vote, which would upset those who benefit from the general apathy that most people feel towards politicians.

I don't want to make this all about politics, because that's not what *Micro Mart* is about. It's just that we have this amazing technology but it's being ignored, and as far as I'm concerned for all the wrong reasons.

Gareth Bray

GET IN TOUCH...

By email

letters@micromart.co.uk

By post

Micro Mart
30 Cleveland Street
London
W1T 4JD

Online

forum.micromart.co.uk



The Download Directory

James Hunt scours the internet for the best freeware, shareware and paid-for application releases

Welcome, once again, to the latest instalment of Download Directory. This month's applications include ExifTool, an applet that helps you view and manipulate file metadata; Stereoscopic Player, a freemium media player that can handle 3D video; Sunshine, a cross-platform file transfer program, and PeStudio, a malware analysis and detection tool.

ExifTool 9.94

Release Type: Freeware

Official Site: www.sno.phy.queensu.ca/~phil/exiftool

Having Metadata on certain types of file can be incredibly useful sometimes and incredibly frustrating in others. On some occasions, you want the data to be preserved for archiving and organisation purposes. Other times, you want it eradicated so it doesn't betray something that might pose a personal security risk, such as camera model or location data. The problem is that

Windows isn't very good at dealing with such metadata, and certainly not in bulk.

Enter, as is traditional, this program. ExifTool is a command line applet that allows you to view, edit and write metadata in a huge variety of filetypes and to do so in bulk if you wish. Everything from audio to video, images to documents, even archives can be stripped of their metadata or have it exported, altered or selectively read. Support extends beyond the usual PDF documents, JPG images and MP3 audio suspects to proprietary formats like RAW images, Visio and InDesign, and even those with less obvious forms of metadata within, like RAR archives and SWF shockwave files.

Learning to use the tool is tricky if you're not used to command line interfaces, and if it eludes you completely, there are third-party GUI interfaces available. That said, the flexibility and power of the command line is what ultimately sets the


```

C:\Users\Mike\Downloads\exiftool-8.69\exiftool(-k).exe
ExifTool Version Number      : 8.69
File Name                    : After the Rain.jpg
Directory                   : J:/Users/Mike/Pictures/Slide Shows
File Size                   : 1647 kB
File Modification Date/Time  : 2010:05:04 16:01:31+01:00
File Permissions            : rw-rw-rw-
File Type                   : JPEG
MIME Type                   : image/jpeg
JFIF Version                : 1.01
Exif Byte Order             : Big-endian (Motorola, MM)
Make                        : FUJIFILM
Camera Model Name           : FinePix F30
Orientation                 : Horizontal (normal)
X Resolution                : 300
Y Resolution                : 300
Resolution Unit             : inches
Software                    : Digital Camera FinePix F30      Ver1.00
Modify Date                 : 2010:05:04 17:01:30
Y Cb Cr Positioning        : Co-sited
Copyright                   :
Exposure Time               : 1/280
F Number                    : 3.6
Exposure Program           : Program AE
ISO                         : 100
Exif Version                : 0220
Date/Time Original         : 2007:06:15 17:05:44
Create Date                 : 2007:06:15 17:05:44

```

program aside. You can use it to process files into directories, rename them based on EXIF data or perform other batch operations. If you have damaged files, you can use it to extract information (such as thumbnails from RAW images) that might otherwise be inaccessible. If you have images missing GPS data, you can even sync them with a GPS track log based on their timestamps to rebuild that information.

“ **ExifTool is a command line applet that allows you to view, edit and write metadata in a huge variety of filetypes** ”

Appreciating that for many computer users command line switch instructions might as well be written in Swahili, ExifTool does have simple drag-and-drop functionality included. At the very least you can use it to easily view a file's metadata, and if that gives you some understanding of how to then edit it, that's fine too.

It definitely helps the software's case that it's in active development. The latest version has added support for iCalendar ICS files, support for embedded preview images, the ability to recognise codes for several new pieces of hardware, and loads of bug fixes too. In a way, putting the effort into learning

this program doesn't seem like such a horrifying prospect if you know the developer is ensuring your knowledge remains relevant.

Pros: Hugely powerful, wide compatibility.

Cons: Not exactly beginner-friendly.

Rating: 4/5

Stereoscopic Player 2.3.7

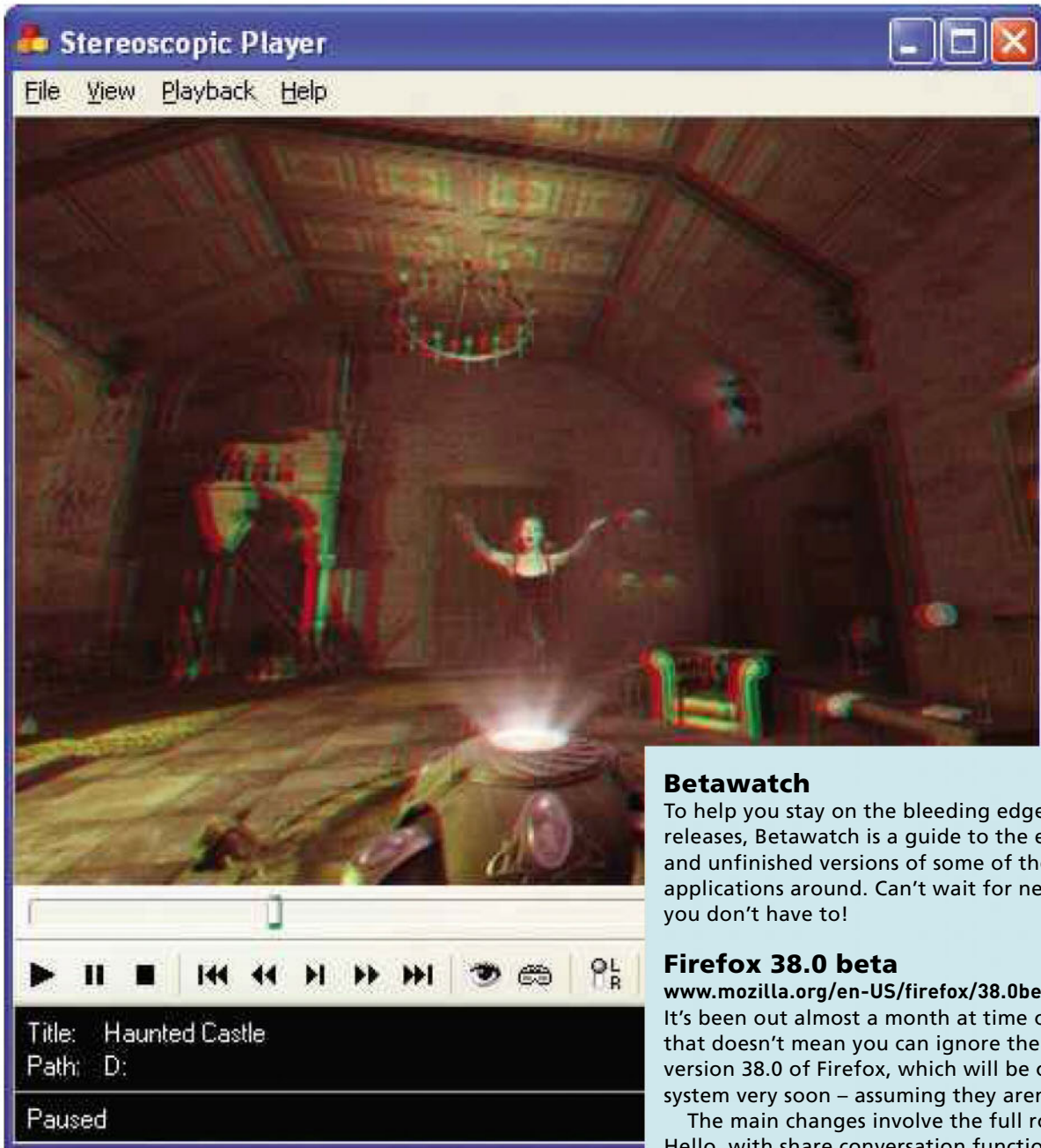
Release Type: Freemium

Official Site: www.3dtv.at/products/player

Having 3D media available isn't a huge amount of use if you don't have a 3D screen to view it on – unless, that is, you have a program like Stereoscopic Player. Rather than place the burden of creating a 3D effect on your hardware, Stereoscopic Player has found a way to do it almost entirely in software.

The list of formats the program supports is huge: AVI, MPEG-1, MPEG-2, MP4, WMV, ASF, MOV, MXF, MKV and FLV with 3D contents are all supported. SSIF (3D Blu-ray files), dual-stream Windows Media, 3D image formats and even completely separate left and right streams can be displayed in a number of different ways. If you have 3D glasses, they can be output in anaglyphic 3D. If you like, you can cross your eyes to combine the images like a magic eye pictures. And if you have a 3D projector, you can use this software as the input. Those with 3D displays can, of course, view them normally.

Although it's mainly aimed at 3D video files, you can use it to play 3D DVD with a little work. In theory, it'll play anything your DirectShow filters support, but you'll have to take a little time to set it up. It's not beyond most users, but it's hardly instant. Beyond that, it's a fairly easy-to-understand media player with the usual set of options. If you can get on with Windows Media Player, you can get on with this.



Betawatch

To help you stay on the bleeding edge of software releases, Betawatch is a guide to the experimental and unfinished versions of some of the most popular applications around. Can't wait for new features? Now you don't have to!

Firefox 38.0 beta

www.mozilla.org/en-US/firefox/38.0beta

It's been out almost a month at time of writing, but that doesn't mean you can ignore the latest changes in version 38.0 of Firefox, which will be coming to your system very soon – assuming they aren't there already!

The main changes involve the full rollout of Firefox Hello, with share conversation functionality enabled for the first half of the beta cycle. Clearly, the feature is being tested for a full release, maybe even in the final candidate of this software.

New features also include tab-based preferences (ending the cramped dialogue-box design of old), the debut of a reading list feature for articles and blog posts you want to look through later, and support for Ruby annotations. HTML5 support also continues to expand with a number of improvements to the parser and media extensions. Support for the non-standard 'Autocomplete' element has also been dropped for username and password fields.

Developers, meanwhile, get a number of small changes to WebRTC and the Debugger UI, but the biggest news here? The copy command has been added to the developer console. Better late than never.

Remember that you can always download the latest beta version of Firefox to trial new features in advance by switching to the beta channel at the link above.

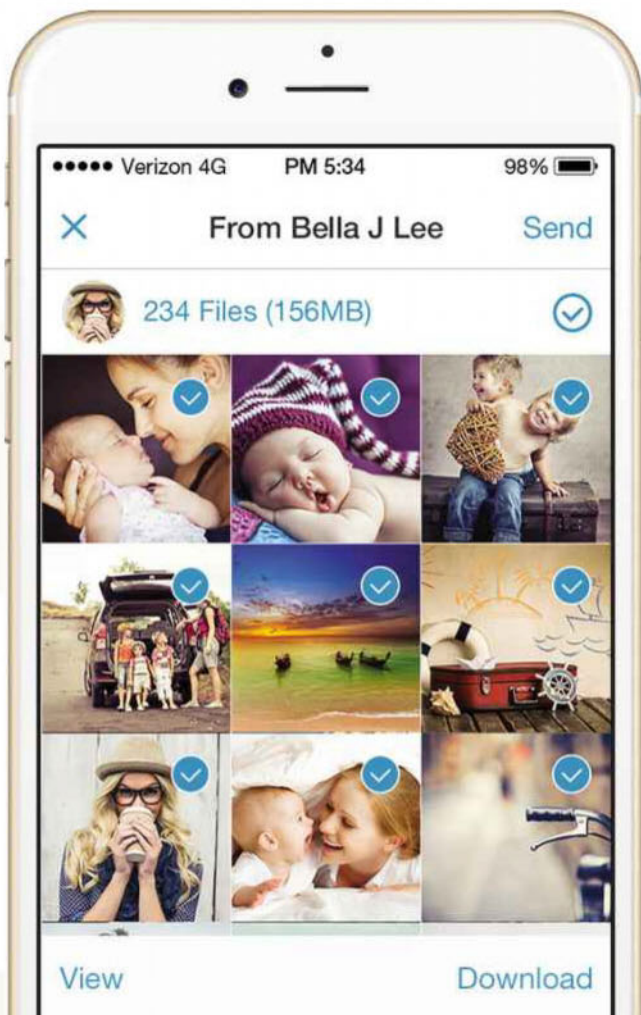
The only real problem with Stereoscopic Player is its Freemium restrictions, which are so brutal as to make the software hard to properly evaluate. The free version can play a video for five minutes before deactivating, which is roughly enough time to check that it works, but not enough time to check whether it works for an entire movie and the unexpected issues that might arrive during that length of playback. You can pay €39 (£29) for a private licence, but that's a lot of money to pay based on five minutes practical use – especially when there are other programs available doing the job roughly as well.

As it is, we like the software itself, but we can't recommend it due to the high price. If it played 3D Blu-rays out of the box, that might help, but given that it doesn't, we can't help wondering if a price that high isn't a little too hubristic.

Pros: Familiar interface, simple options

Cons: High price, lacks disc support.

Rating: 4/5



Sunshine 4.1.4520

Release Type: Freeware

Official Site: www.sunshineapp.com

Cloud storage might be the big thing in computing now, but what if you're more interested in direct device-to-device transfers without the hassle of waiting for the file to upload and send just so someone else can download it? Why not just transfer it directly from one device to the other?

“ Having 3D media available isn't a huge amount of use if you don't have a 3D screen to view it on ”

Sunshine is a program that does just that. It's available on multiple platforms (iOS, Android, Windows and OS X) and makes it easy to stream a file straight from your PC, phone or tablet to someone else's device. The file transfer is encrypted so there's no danger of it being intercepted, and it's never stored anywhere except your device and the target device, so there's almost no danger of it being accessed remotely by a hacker.

Setting up an account is simple enough (you can use your Facebook login details if you like), and you can then share to any of your friends who have the app and are logged in or to anyone who doesn't have it using a non-permanent share link. If you have a DLNA-compatible device available (such as a games console or smart TV), then you can also stream files directly to it.

ReDownloaded

This month, in our regular retrospective section, we're looking back at the May 2013 instalment of Download Directory to see how the programs we reviewed have fared. Are they better? Worse? Gone completely? Here, we find out.

GoldWave

www.goldwave.com

Reviewed Version: 5.69, Current Version: 6.10

After 22 years of development, it would be late in the game for GoldWave to drop the ball now, and clearly it hasn't done that. Although its paid model leaves a lot to be desired in the face of totally free editors like Audacity, you can't argue with the power of the software and the frequent updates it rolls out. It's not really changed since we last looked at it, but given that it's been this way for two decades, who'd expect that anyway?

Messenger Reviver

messengergeek.wordpress.com

Reviewed Version: 2.2.2, Current Version: 2.4.3

We have to hand it to the developer in charge of Messenger Reviver – it's stuck with it. Although the program (which essentially removes the block on MSN Messenger) is ailing as Microsoft deactivates Messenger support completely, development has proceeded

throughout the last two years with updates as recently as March 2015. It's still only delaying the inevitable switch-over, but it's clear that it's a labour of love – and as effective as it ever was.

Free Video Call Recorder for Skype

www.dvdvideosoft.com

Reviewed Version: 1.2.0.622, Current Version: 1.2.28.415

Similarly, Free Video Call Recorder for Skype may not have had any major updates, but even though we wondered how long an unofficial Skype interface would be allowed to run, this software has been consistently maintained since its inception. Admittedly, there haven't been any improvements, but it already earned a 5/5 score for us, and two years on there's no reason to change that.

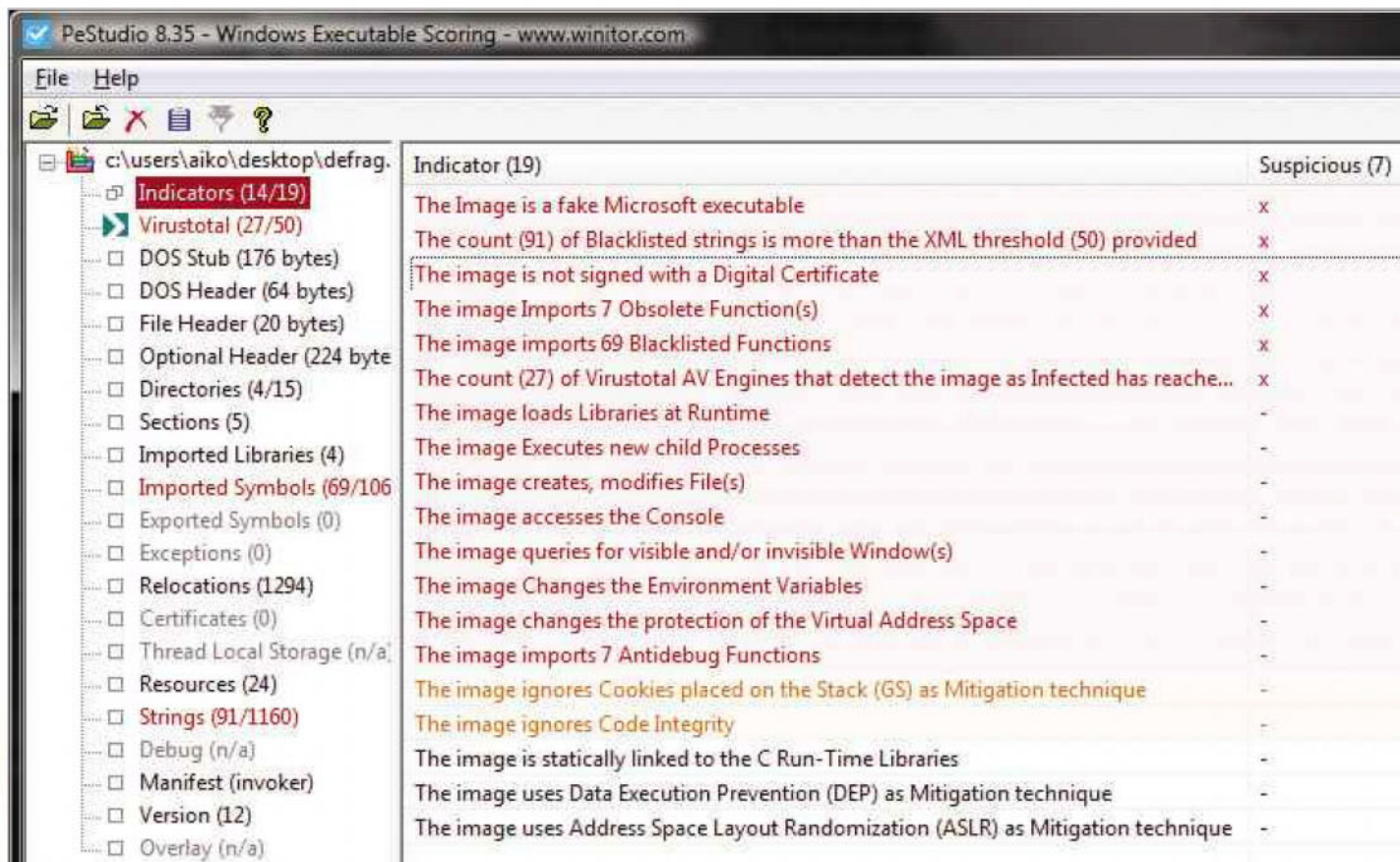
Clover

ejie.me

Reviewed Version: 3.0.325, Current Version: 3.0.406

Clover is a Windows Explorer plug-in that adds tabbed browsing to your file browsing experience, and when we reviewed it in 2013, we thought it was great.

Unfortunately, it hasn't been updated for almost 14 months now, and given its previous regularity, we're forced to conclude that development has probably ceased. It's a shame, but one out of four isn't a bad average for the month!



“ We have to hand it to the developer in charge of Messenger Reviver: it’s stuck with it ”

The interface for Sunshine isn’t particularly difficult to get to grips with, but it’s also clearly designed for the touch interfaces of smartphones and tablets. The Windows version is somewhat thrown together by comparison. It works fine, but it’s not playing to the strengths of its platform in any way.

That said, it does help you transfer files between devices quickly, and in that sense it’s ahead of the curve, especially if you’re trying to send content across different platforms. The days of emailing files to yourself might actually be over. It wouldn’t take a lot of work to take this software from good to great, and we’re hopeful that’ll happen in the future. For now, it’s merely an okay solution to a very common problem – and those specific circumstances make us wonder if ‘okay’ is really going to be good enough in the long term.

Pros: Offers no-lag, cross platform file transfer.

Cons: Windows client is a bit of an afterthought.

Rating: 3/5

PeStudio 8.50

Release Type: Freeware

Official Site: [winitor.com](http://www.winitor.com)

PeStudio’s website describes the program as “a tool that performs the static analysis of 32-bit and 64-bit Windows executable files”,

which perhaps leaves out the most pertinent piece of information: it’s really a malware detector.

Although it’s aimed at developers and experts, it’s actually surprisingly good at holding users’ hands if that’s what they want. The basic detection is simple: drag and drop the program you want to analyse, and PeStudio will instantly produce a report on the software, indicating at each step whether its results are good or bad with simple colour coding.

The analysis can be as simple as ‘Does it need admin privileges to run?’ or ‘Is it digitally signed?’ and as complex as telling you whether any suspicious text strings are found anywhere within the executable. It’s easy enough for even the inexperienced to spot any glaring problems. A built-in VirusTotal report will tell you how many scanners think the file is infected, and if you get more than one or two positive results from the 46 scanning engines, you can be fairly sure it’s not a false positive.

Beyond the basic ‘infected or not?’ functionality, developers and experts can get much more detailed information about the resources the file uses, the functions it calls, the addresses it uses. In fact, would be ideal for anyone trying to write a program that could track down malware, because it shows you exactly where to look for suspicious values and behaviour. If you’re a real expert, you can even use it in command line mode.

Given the wealth of virus tools available that are aimed at the least experienced users possible to ensure wide appeal, there’s something refreshing about a more serious tool like this. We wouldn’t want all our software to be this in-depth, but if it’s this sort of deep malware-analysis software you’re after, then it’s probably the best in its class.

Pros: Capable of cursory and deep analysis.

Cons: The UI isn’t fantastic, but as negatives go, that’s us stretching.

Rating: 5/5 mm

Remembering...

Star Wars: X-Wing

The Force is strong with David Hayward this week

The PC, in the early 90s, had established itself as a gaming force to be reckoned with. The beginnings of the FPS genre were firmly in place with *Castle Wolfenstein* and *Doom*, and more platform-based games such as *Commander Keen* and *Prince of Persia* were enjoying a better graphical success than previous platforms they may have appeared on.

But it was the simulation genre that really lived the high life on the early PC. DOS simulation gaming was in its golden era. There were tons of combat sims, aircraft sims, helicopter combat sims, tank sims – you name it you could probably fly or drive it. However, one simulation stood out from the rest, and that was *Star Wars: X-Wing*.

X-Wing was the first in a series of space combat simulation games that cashed in on the popularity of *Star Wars* and the ever improving gaming power of the PC. It was, for those of us who first played it over 20 years ago, simply amazing. It was pure bliss to get behind the flight stick of an X-Wing, A-Wing, and B-Wing fighter and actually engage in combat with Tie Fighters, Tie Bombers, Tie Advanced and even the bigger cruisers, Star Destroyers and the ultimate nemesis, the Death Star.

But it was more than just pointing your crosshairs at the Imperial forces and pressing fire on the joystick. You had missions to complete, wingmen (or wing-people?) to organise, convoys to protect or destroy, and much more. Plus you also had to navigate three-dimensional space, select targets, and juggle your power with your shields, lasers and engines so you had just enough to survive and still fight.

It was staggering stuff and required lightning fast reflexes before you could attain the rank of admiral.

Its History

Released in February 1993 by LucasArts and developed by Totally Games, *Star Wars: X-Wing* followed the Rise of the Empire era of Star Wars lore. It had you in the role of a Rebel Alliance fighter completing missions through three separate tours of duty, set before the events of the first Star Wars film and working through to the final Battle of Yavin.

The space combat simulation bar was measured in the early 90s by the *Wing Commander* series. *X-Wing* went and blew a hole

through that bar and continued on to a point that no other game could even come close to. It was fast, the AI was good, the individual ships performed according to their specifications, and it was incredibly punishing at times.

Needless to say, things moved on, and the sequel, *Tie Fighter*, improved on the graphics and offered you the chance to fight against the Rebel 'scum' and alongside Vader himself in some missions.

The Good

Amazing gameplay, none of those Newtonian laws to deal with, and a clever power-balancing system. Digital explosions and bits of Tie Fighter being blown away in space – awesome stuff, that.

The Bad

At times punishing. Ever wanted to see how well you'd fare against a several kilometre-long Star Destroyer on your own?

Conclusion

Star Wars: X-Wing was the first in a long line of excellent combat sims for the PC that kept gamers glued to their monitors for years. And as proof of that, and its timeless legacy, you can even buy *X-Wing* and *Tie Fighter* on Gog and Steam now.

In our humble opinion, *X-Wing* was one of the best games ever developed for the PC.

Did You Know?

- If you were good enough, you could take on a Star Destroyer and win. You had to target the ball-like things on the top first to get through the shields, then you had to go for the engines to stop it from hyperspacing out. Possible, but insanely difficult.
- If you typed in 'win' during the first mission, then you gained unlimited shields.



▲ The Death star Trench run. Frantic, this is (that was my Yoda impression)



▲ The A-Wing was fast and nimble but lacked the fire power of the X-Wing

RETRO ROUND-UP

Dave Edwards imagines a world where the sites for new Spectrum, Nintendo and BBC Micro releases suddenly disappear...

One Of Our Archives Is Missing

Last month, something terrible occurred. The web site World Of Spectrum (www.worldofspectrum.org) – repository of just about every game ever released for Sir Clive Sinclair's world-beating 8-bit – went down without warning, and for many weeks. Retro gamers panicked, congregating on forums to curse the folly of not downloading all 600 Gigabytes-worth of it when they'd had the chance, and speculating on whether it had indeed gone forever.

The good news is: it hasn't, it's back.

The bad news is that, when something unexpected like this happens, the resurrection of the site can be the exception rather than the rule.

Until 2012 the Amstrad CPC had its very own WoS-style site, aptly titled CPC Zone (cpczone.emuunlim.org). The dark blue html monstrosity that inhabits this link at this moment, though, is a shadow of Malc Jennings' former creation – where bustling forums, now-unavailable public domain software and all things Amstrad were preserved for everyone... Until the day they suddenly weren't! In 2010, The BBC Lives likewise suffered a quick death, taking hundreds of early MS-DOS Beeb emulators and utilities with it. Acorn Preservation (an Archimedes site of cover scans and downloads) disappeared shortly afterwards. Those were just the "big names". Smaller sites, and the programs archived on rapidshare.com, disappeared overnight when those services were suddenly terminated.

In the case of World Of Spectrum, the site was, and is, the focal point for hundreds of developers of new Spectrum games, and its

temporary disappearance left a big hole. Perhaps most surprising though was that there were no 'mirrors' of it anywhere. The games themselves could still be had from the more dubious corners of the Internet, but not with any of the ease-of-discovery of a proper archive site, and certainly not without a retro gamer having to suffer a fair few 'adult' adverts to get to them!

Don't Delay, Download Today!

A lot of retro gaming sites are one man's labour of love and the amount of time spent keeping them updated should never be underestimated. Further evidence, if it were needed, can be gained by simply flicking through a back issue of *Micro Mart* and visiting some of the links in its articles. Usually, half of them will no longer work. Now, some might say that software rises or falls on its own merits and if all evidence of a game has disappeared within a short period, it probably indicates that the game wasn't particularly good, right?

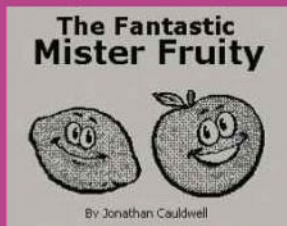
Wrong. The World Of Spectrum holiday proves that an entire library of good – and even great – games can be gone in a heartbeat. It was first point of call, for example, for almost every Spectrum game going and this issue we're looking at one Spectrum game that it houses for free, whilst buying the same game from Cronosoft costs money. That comparison is not a dig at Cronosoft, which supplies collectors' versions of its games on cassette with superb inlays; its target market is different!

I make this point as a rallying cry. If you read about a game that interests you in these pages, get it at once. If you

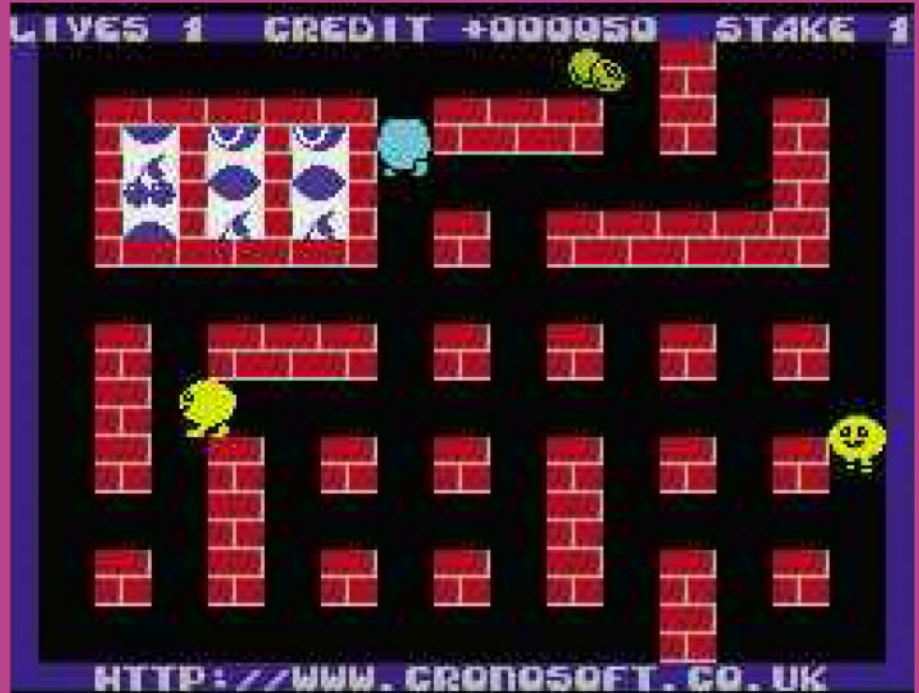
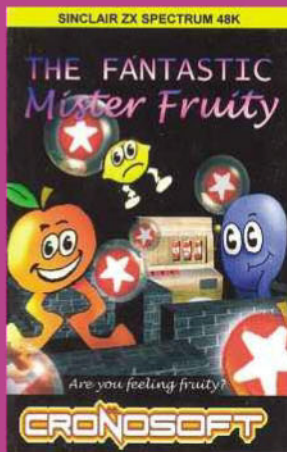


^ There will be few retro game fans who aren't familiar with the World Of Spectrum web site. After the death of CPC Zone, its semester struck fear against many hearts and souls...!

> The *Fantastic Mr. Fruity* – sort of like a randomised version of Bomberman!



> Cronosoft's games all come with amazing cover art and *Mr. Fruity* is no exception



▲ Progress seems too random to be considered fun, although there is a definite skill to placing the exploding portal

procrastinate, even for only a few weeks, there is no guarantee it will still be available. With that in mind, here are this month's new pretenders to the retro crown...

Feeling Fruity

The title *The Fantastic Mr. Fruity* sounds more like a Roald Dahl book than a Spectrum game, and it may be that subconsciously that very connection led me to expect a wholly different type of game to what this actually is. Essentially, *Mr. Fruity* is a maze game where you must roam around a maze dropping portals to kill the demon fruit which also inhabit it. Despatching them isn't easy though, because the portal that you drop doesn't kill them. In fact, if they bump into it, it just gets erased.

Frankly, it's unlike any maze game I've ever played before; it isn't particularly satisfying, however

When you drop the portal however, you simultaneously pull the lever on an one-armed fruit machine; those machines with three spinning reels of different icons. As the third reel comes to rest, the portal explodes, sending missiles in all four directions. These missiles are fatal to the touch, including to your touch – so once you've dropped the portal you need to get out of all four lines of sight. You have to hope that the missiles will strike one of the demon fruits instead. However, even if they do, the missiles won't have any effect unless the fruit struck also appears on one of the three reels spun.

When a fruit is hit, it turns into either some coins (you spend

coins every time you drop a portal/operate the fruit machine) or into a collectible bonus. When all fruit have been hit by missiles, you proceed to the next screen and the number of demon fruit increases.

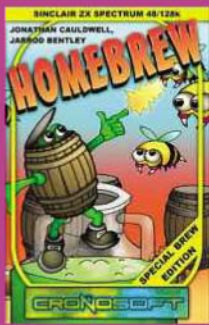
This is a fairly interesting idea and, frankly, it's unlike any maze game I've ever played before; it isn't particularly satisfying, however. The demon fruit move completely at random, and so there's little skill in positioning the portal. The reels also take a random amount of time to spin, further making a 'successful' portal bomb strike even more unpredictable. You can also increase the amount of money you deposit into the fruit machine too – but, with these sort of odds against you, increasing how much you feed the machine has the feel of gambling against the market every time you do it!

The *Fantastic Mr. Fruity* isn't quite chaos theory in action – but it's pretty close to it. See youtu.be/pVobSDnkkCQ for more.

What Shall We Do With The Drunken Specy?

On, then, to *Homebrew* which – like *Mr. Fruity* – is also a Cronosoft release and also by Jonathan Cauldwell. The term 'homebrew' is often applied in place of the word 'retro' to describe new software for old machines. Not so here, though. In fact, *Homebrew* is more fruit-based fare, and invites you to place fruits in a big demi-john and leave them to ferment into a nice alcoholic brew. Hence the title.

You take control of a red barrel that can glide around, shooting the various nasties that appear. Once hit, they turn into fruits which gravity then propels earthward. If you get your barrel underneath them in time though, you can pick them up and carry them to the demi-john. As you add more fruits to it, the level of homebrew it contains begins to rise. The object is to fill the demi-john and proceed to the next level. Colliding with a nasty (and they can be infuriatingly difficult to avoid) drains what little energy the barrel has. Cakes and diamonds occasionally drop from the top of the screen too. Cakes raise the barrel's energy; diamonds turn all nasties into bonuses.



▲ Roll out the barrel



▲ Homebrew is an early, rather than a classic, Jonathan Cauldwell game

➤ You propel a barrel around and collect the fruit then drop it into the demi-john



The game plays well enough, requiring a fair amount of skill and being just difficult enough to provide the player with something of a challenge, but it is hard to get enthusiastic about *Homebrew*. In fact, it's the most underwhelming Jonathan Cauldwell game I've seen so far. The sound is limited to a few shooting noises and a blippy explosion when barrel and nasty collide. The action also takes place in quite a cramped playing area. This means that actually keeping track of all the bouncing nasties for long enough to fill up the demi-john is pretty exhausting stuff. After all of this labour, even a bonus stage might have alleviated the dullness factor a little, but the game simply empties the demi-john and begins over with a subtle increase in difficulty.

I played it until my three lives were gone - but I have no desire to ever return to it. Having witnessed the grand scale of Cauldwell's talents through other Cronosoft releases, both *Homebrew* and *Mr. Fruity* seem to lack the polish of, say, *Egghead Round The Med* (See MM 1346) or *Quantum Gardening* (See MM 1358). A final insult is that the Cronosoft *Special Brew* version promotes itself as having better graphics than the free World Of Spectrum version. Comparing the two, I see no difference at all!

You can download *Homebrew* from World Of Spectrum for free (See www.worldofspectrum.org/infoseekid.cgi?id=0023797), or add physical tapes of both *Mr. Fruity* and *Homebrew* to your collection by ordering through Cronosoft's official website at cronosoft.org/free.com/shop.html. Each game costs £4 plus P&P. To see *Homebrew* in action, visit youtu.be/OHkGVQCnvwM

Free Foodie Fun

Retro Software (www.retrossoftware.co.uk) has been releasing a steady stream of commercial and free software over the past few years. *Mixed Grill March* is one of its less trumpeted releases from 2012 and is an interesting reaction test. You don't move a character in this game. Instead, your character moves of his own free will in hot pursuit of a bandit who has just stolen his mixed grill. Your task is instead to mimic the exact position of your quarry. So if he raises both hands in the air, that's your queue to make sure you put your hands up too.

Failure to do so and you won't be able to follow him through a solid brick wall, as he burrows through this leaving a tunnel in the shape of a specific impression. Hands down instead of up and, instead of following and gaining on him, you'll be flung unceremoniously to the ground with the message "Ow! That hurt!"

There are four levels, prefaced with a little sardonic wit and rounded off with a key-bashing final sprint to rugby-tackle the offender. Initial stages are overcome without too much difficulty and it's fair to say that the fact it's getting more difficult slowly dawns on you rather than being thrust in your face. This is because your character catches up with his prey almost imperceptibly; you gain only a single pixel with each run from the left of the screen into the wall on the right of it. However, when you are almost on his tail is when mimicking his pose becomes most difficult, because your own body almost obscures it. This is clearly intentionally done and your own self-doubt as to your pose can just delay you by the additional nanosecond you needed to succeed.

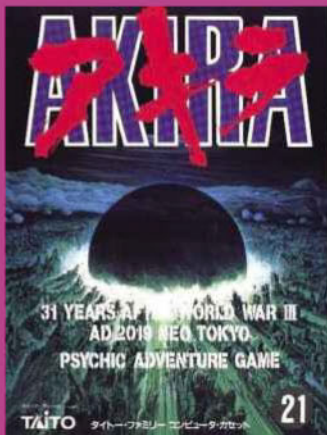
Mixed Grill March (youtu.be/woAjTUc4DL4) has a musical soundtrack, and is rendered in the BBC Micro's most colourful mode.



▲ Retro Software presents a game that we're pretty sure is unlike anything else in the BBC Micro's catalogue



▲ Mimic the pose of your quarry in order to follow him through the solid wall!



▲ Adventure game yes, but psychic adventure game?! Please!



▲ Tetsuooooo! What the heck? Far from morphing into a giant ball of city-destroying energy, a lucky blast wins the game



▲ Akira imagined a future 2019 where legal highs were given out in pubs. It didn't get it far wrong

It may not be particularly visionary, but it's quite a fun game and it's certainly worth dusting off that BBC emulator to boot it up and give it a go. Especially when it's completely free.

Akira (NES/Super Famicom) – Find Of The Month

Akira, a seminal animated movie from Japan, had a phenomenal impact worldwide in the mid-nineties. A few software houses picked up a licence to produce games based on the movie. Alas, the efforts were mostly failures; platformers, pinball games or sideways-scrolling affairs that bore little relation to the phenomenal movie. There's one version of *Akira* that you won't have heard of though. That's the Nintendo version – because it was only available in Japan. Until now.

Akira the game follows in the steps of the movie. Both introduce Kaneda and Tetsuo, members of a gang of young bike-racing thugs in a city wracked by gang-war. When a strange-looking child wanders in front of Tetsuo's bike, causing him to crash, the plot begins. Government agents appear, and whisk the child and Tetsuo off into the night.

The movie follows what happens to both Kaneda and Tetsuo, while the game allows you to 'Choose Your Own Adventure' as Kaneda. Initially, you must discover where Tetsuo has been taken.

There are several problems with *Akira* and they could be summed up by questioning what really makes a game a game. What you actually have here is a book and, although it may be nicely illustrated and have a few interactive elements, it can't really expect those to cut it. You make progress by choosing from a list of actions, typically by deciding whether to 'Look', 'Talk', 'Ponder' or 'Peep'. That might just about be bearable *per se*, but you often have to repeat certain actions many times to avoid a wholly unconnected death in a later scene. To give one example: you won't get far into 'Mission: Rescue Tetsuo' without the help of your girlfriend. However, if you haven't 'look'ed at the members of your gang one by one before you start speaking to her, you'll be shot by the campus security guards when you try. The two events are illogically connected, and similar connections stalk the entirety of the game. This makes progress extremely tedious.

When Tetsuo emerges from Area 51, those nasty agents have fiddled with his brain to such an extent that he starts killing off his former friends. Your friend Yamagata is the first to be offed, and it isn't too long before Tetsuo is eying you up too. Amazingly however, on occasion a lucky blast from your laser will result in Tetsuo immediately biting the dust – bringing the game to a swift end

with absolutely no resolution to the *Akira* mystery at all! On other occasions you'll miss and the game will go on for hours longer and tie up all those loose ends.

If you think that sounds pretty lame, then that's only the half of it. The menu of options sometimes doesn't include any option that allows you to proceed without dying at all – you have to press the B button, and then the A button to bring up a 'secret' menu!

Akira puts its graphics, which are quite good, at the top of the screen. The bottom gives a text narrative on the action. The text narrative appears one character at a time and cannot be speeded up. There's a lot more I could berate too, but you get the general idea. What's good about *Akira* are the graphics and the music and, of course, the fact that it exists at all. *Akira* is an "unofficial ROM hack", meaning some developers got hold of the original, and replaced the Japanese text for its English equivalent. ROM hacking is an area of retro that so far we haven't touched upon so far in the Retro Round-up but the scene is massive, with Japanese and English fans working together to painstakingly disassemble old code, and introduce brand new games to each respective country.

Whilst the game itself may be underwhelming, as far as the ROM hacking goes, *Akira* is as close to perfection as you could imagine, with not a single spelling fluff or a dubious 'Japlish' phrase throughout. Also, as someone who has played all the other lousy *Akira* games, this game is actually the best *Akira* has to offer. Hence why, despite the criticisms, it's my Retro Find Of The Month.

Take a look at youtu.be/roJSNx071w8 to see if you want to give *Akira* a go. As there's no physical ROM cartridge of it, you'll need both a NES emulator on your PC and to visit www.romhacking.net/translations/1725 to download it.

Rounding Off

We can breathe a sigh of relief that World Of Spectrum has reappeared. But we should acknowledge the role of such sites in feeding the Retro Round Up. We are lucky enough that, for whatever reason, we have developers of games for obsolete systems, those who test them, those who publish them and sites to which they can be uploaded, and of course downloaded.

Psytronik, Dragon Archive, ROM Hacking, Retro Software, Cronosoft... you undoubtedly won't be around forever, but as long as you are, you'll keep us both entertained and constantly on guard for the day you do disappear. Assuming that's not going to be any time soon though, I'll be back next month with yet more new retro releases.

Windows

The Last

Dice

Roll



Do financial warnings and Build announcements add up to a critical phase for Microsoft's phone and tablet ambitions?

As a technical writer, it's my job to provide some insight into where the world of technology is going and explain that crooked path. Yet even I've had difficulty trying to comprehend the directions that Microsoft has chosen in recent years, as it struggled to adapt when the world around it shifted dramatically.

The truly head-scratching moment came with Windows 8, a change so radical and half-baked that it left many questioning how a company with so many smart people could so completely ignore its core demographic, the Windows user.

And almost simultaneously the company decided that it needed to be a major player in the mobile space, and it even bought the previously mighty Nokia to fulfil those ambitions.

But even before it shelled out on Nokia, the dream was more of a nightmare, and recent announcements have underlined just how far from its objectives Microsoft now finds itself.

Money talks

Each year around this time, Microsoft must make a SEC (US Securities and Exchange Commission) filing to tell its investors where it thinks it's going financially in the next year. For quoted companies, these filings are critical, because the stock market is all about what happens next, not what is specifically happening now. What stock holders don't like are surprises.

Industry watchers weren't expecting anything wonderful, because the Phone business has been losing market share, Xbox One isn't a

huge success, and announcing a new version of Windows tends to kill sales of the old release.

Early on in the filing, Microsoft admitted that the phone side of its operation wasn't performing well: "In the third quarter of fiscal year 2015, Phone Hardware did not meet its sales volume and revenue goals, and the mix of units sold had lower margins than planned."

The hard numbers, however, revealed that those words were carefully crafted to soften the blow. Because despite posting \$1.4 billion in revenue, and selling 8.6 million Lumia handsets (18% more than the previous year), it actually lost money.

Microsoft doesn't like to break down its divisions any more than it must on financial results and, to confuse matters, it lumps phones in with all other devices and the consumer business. However, it did admit that it had lost money on every phone it sold, to the tune of \$4M. That works out at about 12 cents per phone, which doesn't sound like much until you realise it doesn't include any substantial costs Microsoft incurred developing, designing and marketing the Lumia range. And it's also reduced by the 24.7 million old Nokia branded phones that it managed to shift to mostly developing countries, which it still made some profit on.

When you consider that Microsoft doesn't currently have any new flagship phones, and the majority of Lumias being sold currently are cheap entry-level devices, it strongly suggests it's playing a game it's not qualified to be in.

If having a business that's selling more phones but at a loss wasn't bad enough, Microsoft also decided that it was the right time to accept that some choices made in regards to its purchase of Nokia weren't right. The cost of buying Nokia was \$7.9 billion, and in the financials of the time, Microsoft offset some of that expenditure with the 'goodwill' of having Nokia people in the company, along with their business connections – to the tune of \$5.5 billion.

With Nokia now integrated and a good number of those valuable human resources no longer employees, Microsoft now must accept that the goodwill wasn't worth that much. It doesn't say how wrong it got that number, but it admits that, "In this highly competitive and volatile market, it is possible that we may not realise our forecast."

That certainly means it will write-down the value of the Nokia purchase in the company, and the number being bandied around is at least \$4.5 billion. That's not good, and it still needs to come up with a plan to make money from its phones, other than the rather obvious choice to just stop making them.

After the SEC filing, there was a post-earning conference in which CEO Satya Nadella tried to push the positives: "We continue to demonstrate momentum in the value smartphone segment of the phone market, driving 18% growth in Lumia volume this quarter."

He also outlined a way forward: "However, we need to take further action to reduce our costs across devices as we execute on our Windows 10 first-party hardware plans."

That last comment might well include Surface, because as Microsoft isn't making any expensive phones, it seems difficult to fathom how it would reduce the cost of them much when they're competing with even cheaper Android devices.

“ There was a time when Microsoft's key products only existed on its own operating system ”

It's also worth noting that even though it sold more phones, it still lost market share overall, and 8.6 million Lumias is still only on par with the number of Android phones typically sold in less than a week. What Microsoft needs is a good reason for people to buy them, other than being 'different', and for that it needs to address the lack of apps generally and some critical ones specifically.

Developers, Developers, Developers

If we look at both the 'successful' mobile device operations, namely Android and iOS, they have both been very careful to cultivate their developers. This was easy for Apple, as it essentially created this market, and anyone wanting to sell software on the emerging platform didn't have many options.

Those that didn't like the very rigid and constrained Apple ecosystem soon had Google's more open Android option, and they then joined that bandwagon.

The compelling reason for joining the Windows Mobile platform (as it was known at the time) was always more nuanced, because by its own admission, this was a sector that the company almost completely ignored before Apple started selling huge numbers of phones.

The arrival of Windows 8 and its Metro interface convinced some that there was a common future, even if apps developed for



▲ Alex Kipman, the man behind Kinect was on hand to help demonstrate Microsoft's Hololens technology, and prove that it isn't only Joe Belfiore that has a silly haircut.



▲ The Windows 10 device graphic now includes Hololens and a phone that it launched more than a year ago

Windows 8 weren't compatible with the mobile platform, and they didn't even share an app store.

That is promised with Windows 10, but we're a long way down the road, when this was probably something that should have been delivered with Windows Phone 8. Now even the stalwart Microsoft app developers on both Phone and Windows 8.x Metro must be wondering if they've made a huge mistake. If both these environments will be able to run Android apps, then why would anyone exclusively design one that would be specifically for Lumia phones only?

In short, they wouldn't, and if the trickle of Microsoft apps that it currently attracts dries up, what is the point of the platform? Recent Build announcements put the phone strategy in a new light, because instead of really leading the charge, the phone is hoping to survive from the success of mobile apps on the Windows desktop!

Build It And They Will Come

The keynote presentation at Microsoft's Build 2015 conference included some very interesting news, regarding not only those who develop for its platforms but also those invested in using them.

Before the show began, rumours circulated that the big announcement would be that Windows 10 on all hardware platforms would support the running of Android applications. This turned out to be partly true, though not the complete surrender that some feared. What Windows 10 will have is, as Microsoft diplomatically put it, an 'Android subsystem', specifically Open Source Project (AOSP). This will allow Android apps to run on Windows 10, and it also helps those developing apps to generate a



▲ *Nobody can accuse Microsoft of not being ambitious*



▲ *For turning up and not falling asleep during the long part about Azure, delegates at the conference get to take home the latest HP Spectre x360 hybrid laptop*

Windows universal app from the Java or C++ source code that they made their Android software with.

The difference between this and native app running is mostly semantics, and to underline that point, it actually showed that Visual Studio has a built-in Android emulator capable of testing applications designed for that platform under Windows.

Also, so not to let anyone feel left out, a new Visual Studio was demonstrated on the Apple Mac OS X platform, and the key message of the presentation was the new Universal Windows Platform Bridge toolkits. This will enable developers to bring existing .NET, Win32, JavaScript, Cordova, iOS and Android apps to Windows 10 devices with minimal code tweaks.

Exactly how easy it would be for an experienced Android developer to generate a fully working Universal app from his Android source seems unclear, and many just won't bother, given the emulation option. Apps that aren't redesigned by definition won't call on features and services (like Cortana) without more substantial modifications, and there are Android features that Windows 10 won't have.

The plan here is obviously to address the shortfall in Windows Store applications, by making it relatively easy to repackage Android or repurpose Android and iOS projects to Windows 10, which Microsoft is promising will have a billion devices using it within '2-3 years'.

These changes also open the doors to Windows desktop apps being available on the store – something that has looked like being on the cards since Windows 8 first appeared.

In fact, for this writer, this was the best part of the presentation, because what Microsoft has done is create a model where Win32 and .NET applications installed through the store are treated differently, so they can't make modifications to existing DLLs that other apps use, or generally muck up the PC. Instead, they're cocooned in their own virtual system bubble that can be easily unplugged when you've had enough of them.

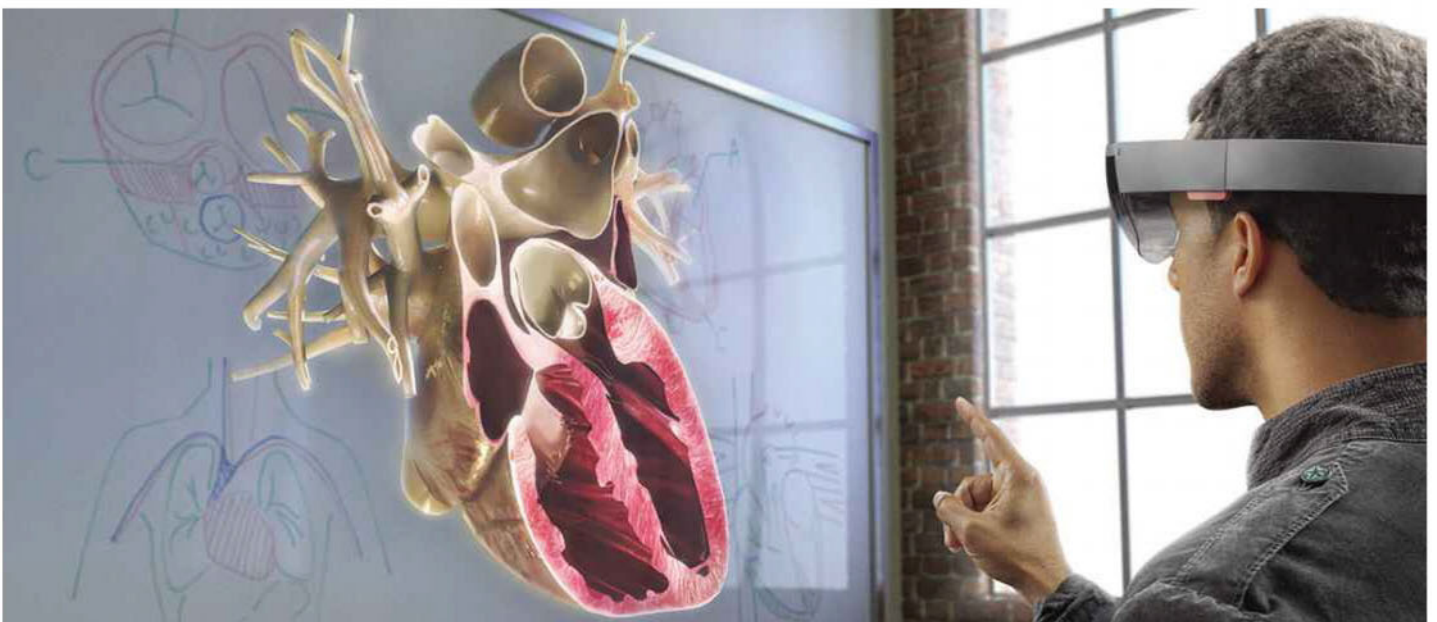
What Microsoft didn't mention, however, is if it will be expecting a cut of the action from the likes of Adobe, when it releases its Elements app through store when Windows 10 launches. I suspect Microsoft will want a slice, though that might just encourage app builders not to use the store and keep all their cash.

While this isn't where some feared Microsoft was going, it's gone a lot further in supporting other platforms than it's ever done before, and it even made much of the 'open source' aspect of its approach.

The days of Bill Gates seriously trying to assert that 'Open Source' meant that nobody could improve software seem a very distant memory now.

Exclusively Inclusive

There was a time when Microsoft's key products only existed on its own operating system, Windows. It made some concessions to Apple





in respect of Office and IE, but these were on the basis that Apple had a small PC niche that Microsoft was happy for it to keep.

What it wasn't about to do was give sustenance to an OS competitor like Linux, especially one that was largely free to consumers. As if to underline this position in red marker pen, Steve Ballmer famously said in 2001, "Linux is a cancer that attaches itself in an intellectual property sense to everything it touches."

And around the same time, Linus Torvalds also said, "If Microsoft ever does applications for Linux, it means I've won."

For those that might have missed the fact, Android is by definition a derivative of Linux, and Microsoft does a range of applications for that platform, and it also has them for Apple's iOS.

The bitterness of that pill Mr Ballmer is sweetened somewhat by the knowledge that Microsoft does make about \$2 billion a year by strong-arming Android phone makers for the OS's infringement of its patents, without ever making public what those infringements might actually be.

To use Microsoft Office on Android (and iOS) you need an Office 360 licence, so even if it doesn't own Android, it's making money from its ecosystem either directly or indirectly.

This change of policy from an almost exclusive deal, where Microsoft's app divisions only supported its own ecosystems, to one where it will make money any place it can is indicative of how the chrome bumpers of Windows have tarnished over the years. It's now more about chasing a dollar than being the company that controls the PC world, and once you've taken that path there really isn't a way back.

But for those that don't like this direction, that was difficult news to take, signalling that the company is now convinced that there isn't a way back for Windows to the glory days, and the future is all about playing nicely with others in a wider context.

Possible API Problems

As was highlighted by a few tweets that appeared during the Microsoft presentation, there is a potentially huge problem for Microsoft in embracing the APIs of other companies in the way that it's chosen.

A long-running case between Oracle and Google about the Java API has recently been sent to the US Supreme Court, after a lower Federal Circuit court found in Oracle's favour that the Java API was protected by copyright.

If this is upheld, then it's a huge problem for Google, but it could also be disastrous for this new strategy outlined by Microsoft. If you can't, as the Federal Courts decided, reuse some of the API structure and naming, as Google did, then you can't create an API mapping that allows one OS to execute the code designed for another.

Google's defence used the example of Remington, which created the first QWERTY keyboard. If its organisation of those keys was protected under copyright, then nobody else would have been able to make one with that layout for 50 years afterwards. The impact on the general acceptance of the typewriter would

“ It's now more about chasing a dollar than being the company that controls the PC world, and once you've taken that path there really isn't a way back ”

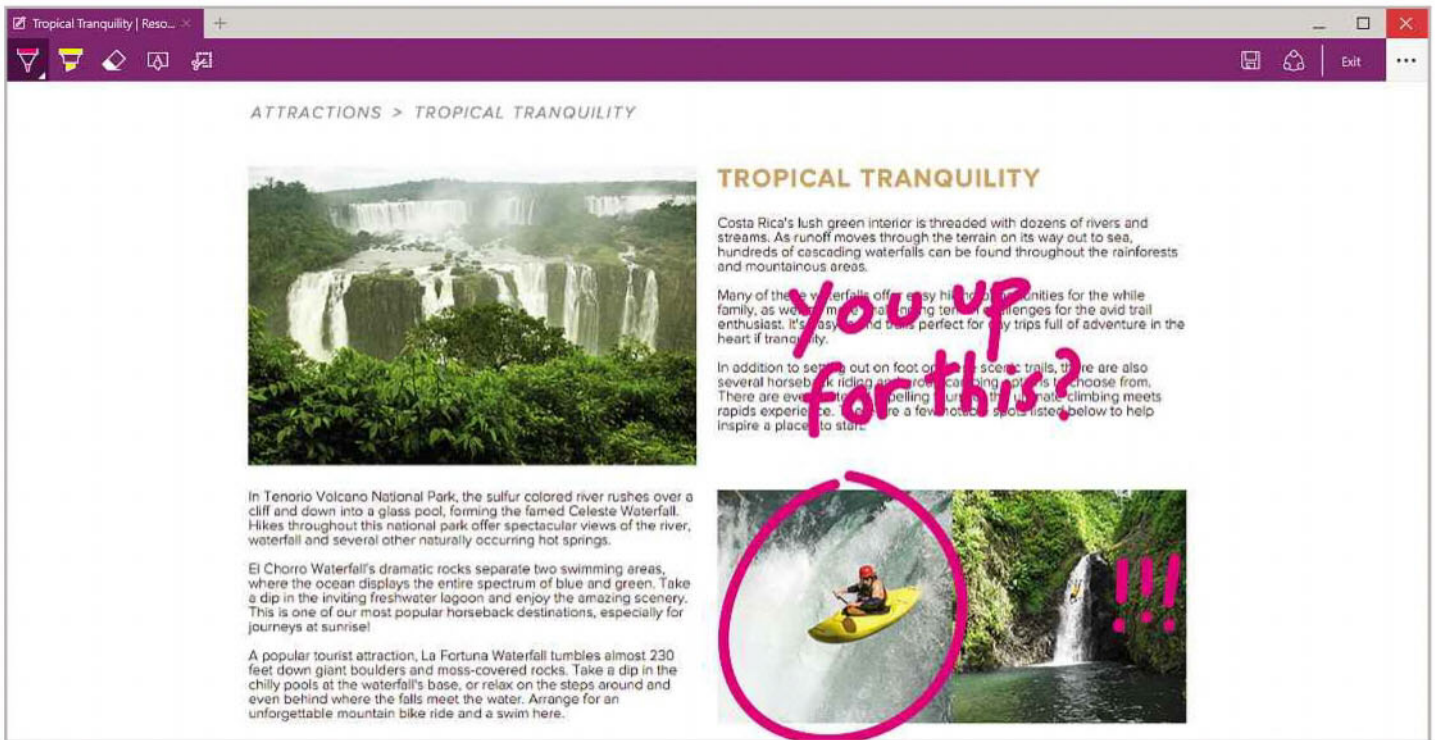
have been massive, and it would probably have damaged the market for them irreparably.

However, even if Oracle does win, an earlier district ruling does give some wiggle room to both Microsoft and Google, in that they might be able to legally infringe under a 'fair use' policy.

In one of those odd quirks of fate that the tech industry seems to overflow with, Microsoft might be backing Google on this, because the implication of API copyright isn't a pleasant prospect for either of them.

Hamburgers All Around

If you're wondering what an Android or iOS app would look like running on a Windows phone or tablet, then the answer is pretty much like it does in its native environment. Although the development tools or emulation can help the code to run and interact



▲ The new browser previously called 'Spartan' now has a proper name: Microsoft Edge

with the underlying OS, it won't redesign them to look like textbook Modern UI ones.

When Microsoft first launched Windows 8, it made much of its design ethic and how it had refined the visual language of its UI more than ever before. It got very wrapped up in this and how its design model was the way forward, and some of its thinking can be experienced if you read the article posted at www.microsoft.com/en-us/stories/design.

Microsoft, at heart, is a software company and not a design agency, and therefore filling the store with apps is actually more important than its love of 'flat design'.

The recent appearance on some Microsoft apps of the 'hamburger' symbol reinforces the change in attitude, because this is a UI feature that has become popular on both Android and iOS.

With the ability to rapidly port apps from the competing platforms, the first victim of this change will be the Modern UI design ethics, because developers just want their apps on the store in a way that works and most people can use.

In all fairness, this is something we're seeing already on the two most successful mobile platforms, because iOS apps that appear on Android often carry with them the Apple look and feel, and vice versa. And the Microsoft apps that have appeared on both of them have a Modern UI styling that makes them look a little odd in the context of native tools.

If Microsoft's plan works and developers use the Universal Windows Platform Bridge toolkits to convert their products, then the majority of apps in the store won't adhere to Microsoft's design principles, confusingly.

The Final Dice Roll

I must hand it to Microsoft, this is a very bold move, considering how badly its plans have gone up to this point. It isn't, however, without a few potential problems, above and beyond Oracle's own Sword of Damocles I mentioned earlier.

At this point the phone and tablet side of the Windows equation is the immediate problem, with the desktop part of the deal being healthier, even after Windows 8.x was generally reviled. The plan, as outlined by the Build announcements, is that by mostly giving it away free, Microsoft will create a very large number of Windows 10 users in short order. The hope is that this will encourage developers to support the OS, and when they do, those apps will automatically spill over into the mobile products, addressing those failings.

As great a plan as it might seem, I can easily point out some pretty major sticking points for why that might not be as easy to achieve as Microsoft clearly seems to think it will.

The first problem is that Windows desktop users don't want mobile apps; they want desktop apps. Even many that use Windows 8.x on a daily basis have entirely ignored the Windows Store and whatever content that was in it.



Having more apps in there isn't really going to change that, because for most desktop users, apps designed for a mobile environment look very clunky and limited in comparison with their desktop counterparts. They might start using the store to find and install desktop apps, but that won't help phones and tablets, because these apps won't appear on their version of the store.

In the Build presentation, Terry Myerson demonstrated that *Candy Crush Saga* had been ported from the iOS version to a Windows Universal model using the new development tools. But

“ Microsoft must make sure that Windows 10 has some really convincing story to sell to punters when it arrives ”

surely, this was a very bad example, because *Candy Crush Saga* is something all Windows users can already play simply by logging into Facebook!

If Windows 10 users still don't use the store, and instead use the OS as a shiny new version of Windows 7, then the motivation for developers to write for the universal platform vaporises there and then. It will also take two to three years to get Windows 10 established, during which time there isn't much incentive for developers with mortgages to pay.

In the meantime, Microsoft's devices division is haemorrhaging cash, with no prospect of realistically turning that around.

I might be prejudging this, but given the financial news that came ahead of Build, that leaves the phone and tablet product ranges in the firing line.

What's important to realise is that Satya Nadella wasn't supportive of the plan to buy Nokia. That was all Steve Ballmer's idea, and it's one that Nadella has been forced to worth with. He's a pragmatist at

heart, and taking the Nokia pain while that tail can still be pinned on Steve Ballmer is probably the best of a poor selection of choices.

Microsoft might still be determined to be part of the mobile equation, but Satya's job is to return growth and profit to the company, whatever it takes. Making hardware was never a core business for Microsoft, and the divisions that do it (Xbox, Phone, Surface) have all cost Microsoft billions of dollars over the years, and none of them show any great possibility of returning even a small portion of the money that has been poured into them (and Bing).

We're approaching a point, or maybe we're already there, where the only fiscally prudent course of action is to put these lame ponies down humanely and hitch the Microsoft wagon to someone else's horses. How investors might react to that is difficult to assess, as it could be argued that Microsoft is gambling on Android's future, not its own.

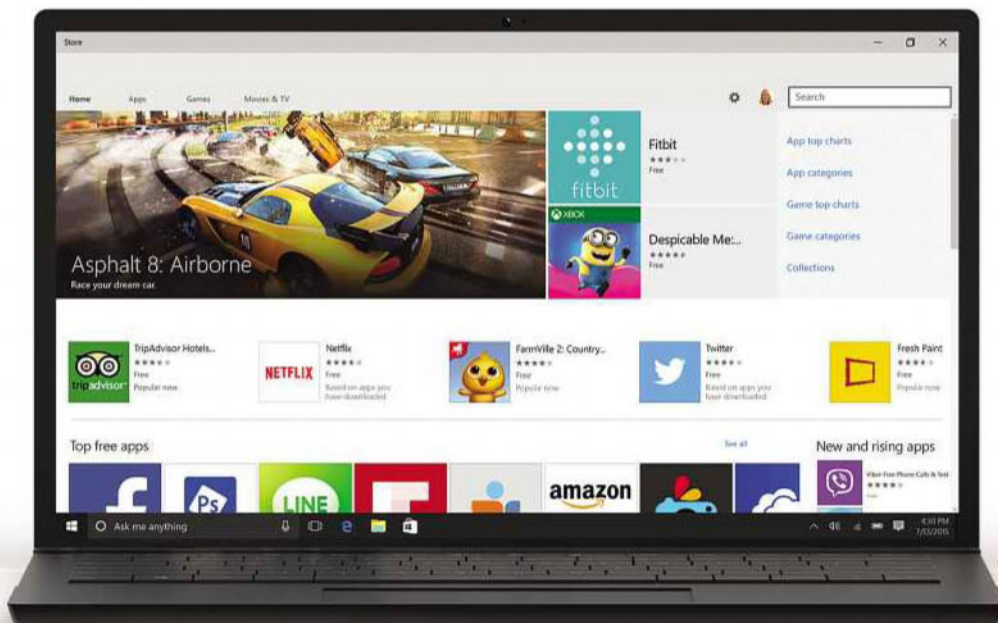
Even more concerning is what this says about how confident Microsoft is in Windows 10 for the desktop. That it needs to add an Android subsystem to make people use it is a pretty damning position to be in, even if it could be argued that it's squarely aimed at making the phone and tablet side of the offering more believable. It's one step away from running Android apps natively, if it's not there already.

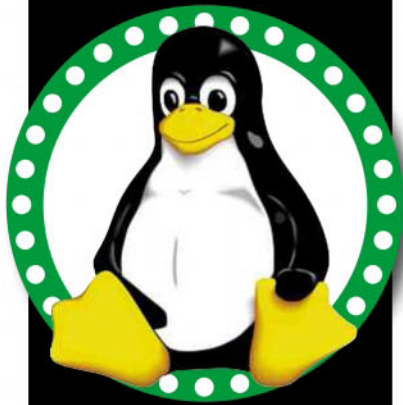
It could be argued that in one fell swoop Microsoft has not only hung the few loyal developers it has left out to dry, but it has also waved the white flag in regarding both its phone and tablet products.

Microsoft must make sure that Windows 10 has some really convincing story to sell to punters when it arrives. If it's broken, late or just a version of Windows 8 designed to appeal to Windows 7 users, then the game is truly up, if it isn't already.

In the meantime, the Devices Division will be going on a bread and water diet, while the CEO reaffirms that the company is focused on software and services business, and not one that makes cheap phones a few people buy at a loss. Microsoft must not only deliver those billion Windows 10 users but also make them embrace universal apps on their PCs for all this to work. Failure in either respect could have dire consequences at Redmond, and for once it seems that those managing the company fully comprehend that. **mm**

► The critical Build 2015 announcements were all about filling the Microsoft Store with apps that people want to use and not ignore





David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Back To Basics

An interesting command line project this week

A few weeks ago, I set about relearning the command line in Linux, as I felt that I had lost touch with the most powerful aspect of the operating system and was thoroughly spoiled by the flashy and easy GUI.

As most of you will know, once you open up the command line can of worms, you soon come to appreciate the fact that everything you thought you knew was only just scratching the surface of what's hidden below.

Take, for example, Netcat, an amazing little project to create a chat server so other Linux clients can join and engage, all run from the command line.

Netcat

The chat server makes use of the Netcat command in its shorter form, nc. Netcat is a powerful command in itself, a reliable back-end command that features a host of network debugging and exploration features.

If you have a several Linux machines, all you need do is nominate one as the server and

find out what its IP address is. You'll also need to check that Netcat is actually installed as a package on your version of Linux, which I think it is these days by default – but check anyway or you won't be going very far.

From the designated server, enter the following in the terminal:

```
nc -l -vv -p 6901
```

This will start the listening connection on the server IP address using port 6901. You can choose any port you like; I used 6901, as it's a part of the Windows Live Messenger range of ports for voice.

Next, on another Linux machine (or even the same one), in a new, second, terminal instance, enter:

```
nc 192.168.1.101 6901
```

I'm using the IP address of my server in this instance, so you'll have to alter that part to match yours, but the port should remain the same as the

previous one you picked in the server command.

With luck, the command will open up the port, and you can enter anything you like into either of the command windows, and it will appear on any machine that has entered the command above. When you want to quit form the chat, simply press Ctrl + C.

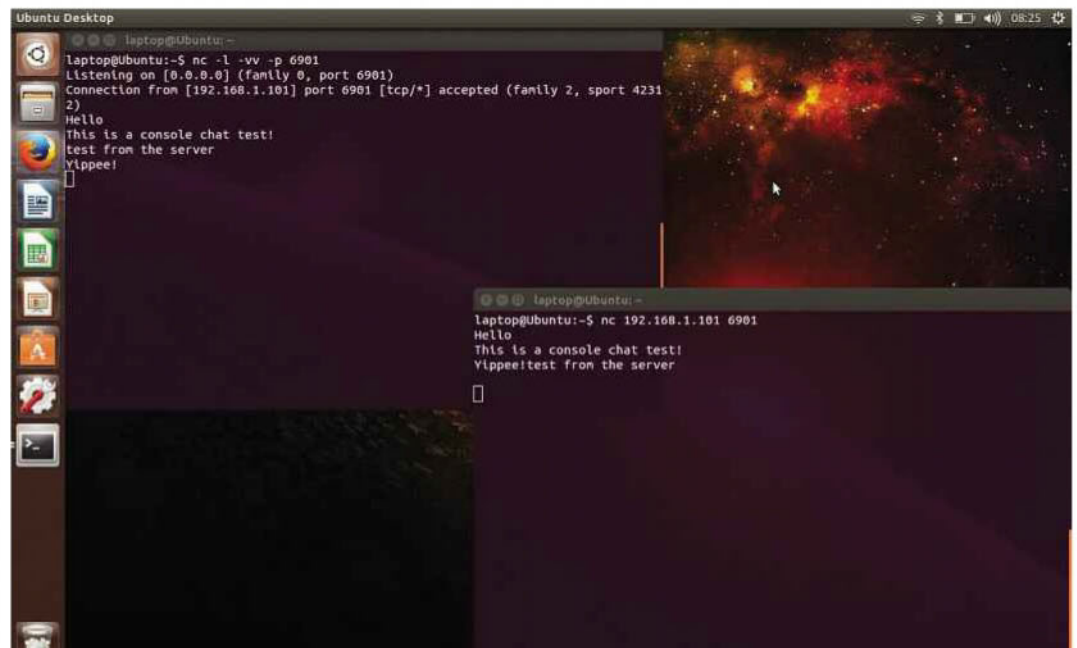
What Else Is There?

That of course is just one small example, and you could probably initiate it without the extra flags. There may even be another way to achieve the same goal by using a different command. Suffice to say, it's piqued my interest in the command line once more.

Based on that, I was wondering if you good and knowledgeable Linux users out there had any other nifty command line projects you'd like to share with us?

If you do, then please drop us a line and walk us through the project. Until next week, folks.

▼ *Create your own chat server in a single command*



The More Things Change...

Craig Grannell bangs the drum for the incremental update and also suggests more tech fans recognise things are moving pretty fast

A criticism often levelled at Apple is that its updates don't go far enough. Instead, people complain that we're forever consigned to a kind of treadmill of incremental updates, each product only very slightly different from the previous one. Occasionally, an industry is upended, but mostly we get a slightly different notebook, smartphone or piece of software. In short, it's really boring.

When I see such critiques, I can only imagine those making them live purely in the moment and give scant regard to the history of technology. Certainly, if you've been around the block a few times, you might admittedly feel a bit jaded by yet another iPhone or yet another Mac, but if you don't feel even a tingle of excitement about the fact we're currently living in the future, you're probably dead inside and should contact an undertaker immediately.

In my home office, I have reminders of the past liberally dotted about the place. Lurking near my iMac is an original ZX Spectrum; atop a speaker is the Spectrum's ancestor, the ZX81. The Spectrum still manages to somehow look somewhat like it belongs – a kind of chunky external keyboard with a weird layout and rubber keys. But the lightweight and tiny ZX81 looks more like a children's toy – a computer only in the vaguest sense of the term when it comes to any kind of modern understanding. Yet in the early 1980s, Sir Clive Sinclair's

strange little device was a thing of wonder. How far we've come in 35 years or so, even if day-to-day many people would argue technology is barely moving at all.

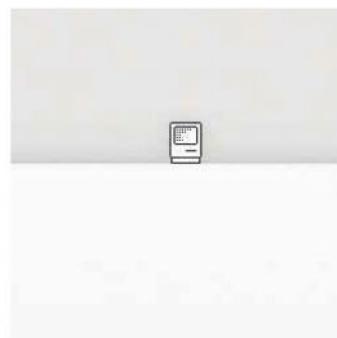
But often it's only by juxtaposing technology from different eras that we see how far computing has really progressed in relatively little time. Now and again, I happily leaf through a book of Susan Kare's original Mac icons. She reasoned that they should be akin to road signs rather than directly denoting the action or response they represented. Each one of her creations is pixel-perfect – pretty much literally. Back in those days, there was barely any room within the confines of Mac icon boundaries, each one being a mere 32-by-32 pixels. Today, OS X icons can be a mammoth 1024-by-1024, dwarfing not only their 1984 equivalents, but even the entire display from the original Macintosh, which was only 512-by-342.

Naturally, some people have nostalgia for the past. But pixel art is now an artistic decision rather than something forced on people due to the limitations of the technology they're working

with. And while the odd videogame might look good with chunky characters romping about the place, gigantic pixelated icons and interfaces would be ridiculous on a modern MacBook or iPad. Pretty soon, regardless of the brands of technology you favour, individual pixels will pretty much be impossible to detect on any display – they'll be consigned to the past like Spangles, Whizzer and Chips, and *Knight Rider*.

So it's good every now and again to delve back into technology's past, as a reminder. Things are changing pretty quickly. Technology is amazing, frequently even surpassing what science-fiction authors imagined only a few decades ago. And if you're skeptical about all this, you can always pop onto eBay and grab yourself an original Mac or even a ZX81. See how long you last before you wrench yourself back to the present and suddenly gain a newfound appreciation and respect for that next 'incremental' update that you'd previously have dismissed as boring and irrelevant!

> **Caption: OS X's Finder icon, with the original Mac icon as a tiny hat. Quite a change over 31 years**



Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find Craig on Twitter at @craiggrannell

Mac



Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Which Watch

Ian McGurran stacks the Apple Watch up with the alternatives

The best thing since the invention of the sliced wheel is now upon us, and mere mortals can buy themselves a piece of the future – well, a timepiece anyway. It's taken Apple time to invent the smartwatch, but finally it's here and never again will our wrists be so erm, un-smart (?). Well, contrary to popular opinion, there were smart things for the wrist before Cupertino's release, so let's take a look at a few of the alternatives.

Pebble – £74.95 And Up – iOS, Android

If there's a device that can lay claim to reigniting the clamour for a wearable smart device, it has to be the original Kickstarter golden boy, the Pebble. As Pebble had nothing to compare against when it arguably invented the modern smartwatch, it is more concerned with stacking up well against 'regular' digital watches than current smartwatches. Therefore battery life is a greater priority here than bells and whistles, and the nice-but-not-OLED E-Ink screen may not appeal to the glamour brigade. Their loss, though, as Pebble is one of the few mature smartwatches, with many of the failings of the newer ones ironed out. It's arguably the most complete device and certainly the one you'd go for if charging your watch nightly seems bizarre. Just don't expect compliments.

Microsoft Band – Around £169 – Windows Phone, Android, iOS

If you're on the Windows Phone platform, you've probably felt a little out of the loop with smartwatches, especially as few of them mention the platform. Somewhat out of the blue, then, was Microsoft's announcement of its own smart, er, band, the

excitingly-monikered Microsoft Band (presumably Redmond's in-house music combo has had to change its name). To be fair to the Band, it's more a competitor to the likes of the Nike Fuelband than smartwatches, but it does have features over and above the fitness elements, such as messages, weather, calls and other general notifications. It's not as cheap as the Pebble, but it arguably offers more if you're into fitness. It's also the only platform agnostic device on offer.

Samsung Gear S – £369 – Some Samsung Galaxy Phones

Closer in spirit to the classic 'Dick Tracy' wrist communicator, the Gear S is essentially a phone for your wrist, one with its own SIM and therefore support for calls and data. While this is kind of what people originally thought smartphones should be, the Gear S now seems a little out of place. It's a pretty big affair, closer to a cuff than a watch, but it has a beautiful, large 2" OLED screen on which you can perform most functions of a basic smartphone. What's odd, though, is that, despite it being capable of self sufficient performance, Samsung decrees that you still need a Samsung phone to perform functions such as installing apps or syncing media. This is due to the watch running Tizen, not Android, but it does narrow the market for the Gear S considerably. Expect its market appearance to be fleeting.

LG G Watch R Urbane LTE – 650,000 Korean Won (around £400)

LG's G Watch R was arguably 2014's best Android Wear



device, showing the platform for what it can do with decent hardware. The Watch R Urbane is 2015's iteration, essentially 2014's model with a high-quality metal shell, but the LTE version is something different again. Yes, confusingly the Urbane LTE isn't an Android Wear device but is instead based on the long-missed webOS, purchased by LG from HP and also powering its TVs. Something of an experiment, it appears aimed at Korean executives, with a Korean to Chinese and English translator and golf swing app. Whether it ever appears over here isn't clear, but certainly LG's use of a proprietary OS like Samsung is now using is no doubt something Mountain View will be taking note of.

The smartwatch is still a bit of a strange landscape at present, and while the Apple Watch will surely bring it to the attention of the masses, there's plenty of competition for the i-less of the world. What's more, with Android Wear rumoured to be coming to other platforms, including iOS, the competition might just be where the future excitement comes from.

Router Ruminations, Part 4

Andrew Unsworth looks at the highly convenient but often overlooked portable router

Over the last few weeks, we've looked at the routers you use in your home that provide access to the internet and/or a LAN through a socket on the wall. However, you don't need a landline connection or a fancy fibre broadband connection to get online and share the internet with your family and friends. You can simply buy a 3G or 4G portable router and use it with your tablet, phone, laptop or whatever.

You can even use it in the car so your loved ones can stream films on a long drive, for example, or let your car access online services if it's a fancy new model. A portable router is also an especially good backup if your mobile phone contract gives you a miserly data allowance, and it runs out when you most need it.

When it comes to buying a portable router, there are a number of options. You can either buy one that's locked to or branded by a network provider or you can buy an unlocked router and pop a SIM card in it. This is true whether you pay for your data monthly through a contract with a network provider or if you pay as you go. Whichever way you choose to pay for your data, portable routers are typically similar in features and operation, and in many ways setting up a portable router is similar to setting up a mobile phone.

That is, you prise the back off the router and insert the battery and SIM card. It's common for portable routers to have a micro-SD card slot too, for sharing photos, music, documents and whatever else across the network. Once set up physically, you simply

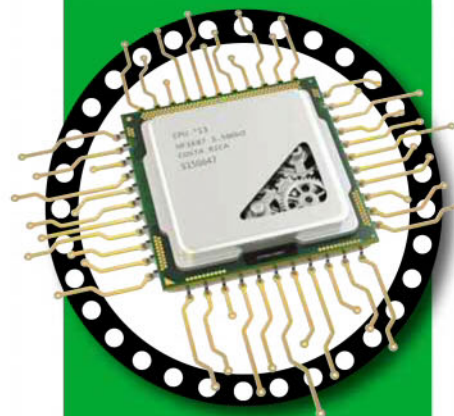
turn on the portable router, let it connect to the mobile network and then use it as you would any other wi-fi router.

Portable routers typically have fewer configuration options than a full-size router for your home, but there are probably more options than you'd expect. The better routers provide wi-fi networks on the 2.4GHz and 5GHz bands, and have comprehensive wi-fi security options, along with advanced options such as port forwarding and the ability to set up a DMZ.

At the time of writing, you can buy a Huawei E5330 from

Three on a contractual or pay-as-you-go basis (www.three.co.uk). You can buy an unlocked Huawei E5372 from Amazon too (tinyurl.com/m9a35n6) and enjoy 4G data speeds if your data SIM allows it. Another good option is the TP-Link M5350, which is just £40 from Currys (tinyurl.com/pzasepm). The M5350 is 3G only, but it's still a good buy, and 3G is still fast enough to stream films, view web pages and download music.

If you haven't experienced the joys of mobile broadband yet, it's well worth getting a portable router.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

City Of The Dead

Indie survival horror game *Phantasmal* sees you sneaking around a monster-infested Kowloon Walled City. It's on Steam Early Access now.

This week, Ryan checks out the indie survival horror game *Phantasmal: City Of Darkness* and finds out what the maker of *H1Z1* thinks about the future of MMOs...

Plug & Play

Remember *3D Monster Maze*? Programmed by Malcolm Evans and first released for the Sinclair ZX81 in 1982, it introduced many of the core elements you'd expect to find in a modern survival horror game: a claustrophobic network of corridors, a deadly creature hunting for you (in this case, a T-rex) and an atmosphere that can switch from creeping dread to outright fear at an instant.

There are echoes of the seminal *3D Monster Maze* even in the glossiest, most expensive horror games released today. For all its retro-future stylings and stunning sound design, *Alien: Isolation* was essentially that game all over again. It's just you, a network of corridors, and a very hungry predator.

Which brings us to the indie horror game *Phantasmal: City Of Darkness*, which recently appeared on Steam Early Access. Its lighting effects and textures may be a world away from *3D Monster Maze*, but the same ruthlessly simple heart beats beneath it; the gameplay can switch from nervy stealth to pulse-pounding terror in a heartbeat. *Phantasmal* even has randomly-generated maps, just like Evans' 80s masterpiece.

Phantasmal's set in Kowloon Walled City, an area of Hong Kong that had around 30,000 inhabitants living in its huddle of ramshackle buildings and narrow walkways before its demolition in 1993. In developer Eyemobi's hands, the city has become a shadowy haven for all kinds of creatures seemingly inspired by famous horror and fantasy films; there are giant, facehugger like spiders, skinny, humanoid creatures that look like something out of *Pan's Labyrinth*, and a creepy guy in a coat who stands facing a wall in what might be a reference to *The Blair Witch Project*.

To defend yourself from *Phantasmal's* maze of monsters, you'll find makeshift weapons like planks of wood and lengths of pipe. There's a gun to be found somewhere in each level, but in true survival horror style, its ammo is severely limited. Fighting is, therefore, a last resort – with stealth being the safer option for the most part. It also seems that keeping your in-game character's grip on sanity is a major part of the game, as the more the protagonist fights *Phantasmal's* creatures, the more damaged his psyche will become.

The game's design team, lead by Joe Chang, plan to keep

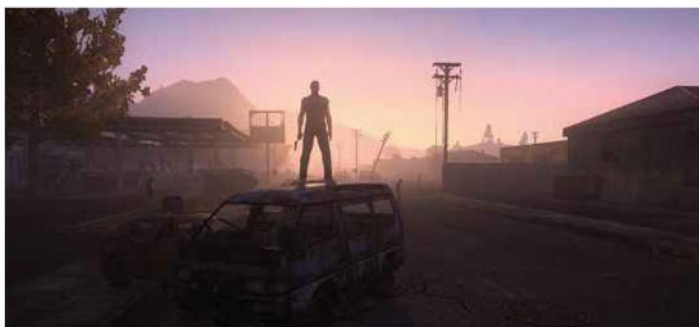
adding to the game over the coming months. We're promised improvements to the enemy AI, environments and story all, but even in its early state, *Phantasmal* looks highly promising. It's also a reminder that, even though the graphics and plotlines of survival horror games evolve, the button-pushing ideas that underpin them are as primal as they were back in 1982.

So while –once again –it's just a player, a maze, and a scary monster or two, it may be worth keeping up to date with *Phantasmal* at www.eyemobi.com/phantasmal.

Online

Do the majority of gamers still want to sink hours into raids in games like *World Of Warcraft* or *EverQuest II*? Not according to John Smedley, the Daybreak Company studio boss behind the zombie apocalypse sandbox game, *H1Z1*, currently available on Steam Early Access. In an interview with **GamesIndustry.biz**, he argued that, while *World Of Warcraft* still enjoys a healthy following, the market for games like it may well be numbered.

"I firmly believe the days of the *WoW*-style MMO are over," Smedley said. "And that means we have to change with the



▲ "The days of the WoW-style MMO are over," says Daybreak studio boss John Smedley. Instead, he says, more concise experiences like his own H1Z1 will take its place...

times. Luckily, we were kind of early on that bus as opposed to late. But we're changing what we're making."

Most players, Smedley argues, simply don't have the time to devote to lengthy sessions in *Warcraft*; instead, they're gravitating to games that offer shorter, snappier experiences – which is where, he says, *H1Z1* comes in.

"The average life expectancy in *H1Z1* might be 45 minutes, and that's what today's gamers want," Smedley continued. "How many people do you still know that are still raiding in *WoW* every night, or *EverQuest* and *EverQuest II*? It's just the time commitment necessary has changed so much," Smedley explained. "That means we need to change with the times, and we

are. So we're getting interested in a broader array of games and gaming styles."

In a later session on Reddit, meanwhile, Smedley reassured his readers that Daybreak would still be supporting its MMOs *EverQuest* and *EverQuest II* (the studio is, he says, "[in] for the very long haul and providing exactly the kind of cool content our players have expected), but reiterated his studio's commitment to providing shorter, snappier experiences in *H1Z1* and the forthcoming *EverQuest Next*.

"That's precisely why we aimed so high on *Everquest Next*," Smedley wrote. "We know we needed to change our aim on these games. We can't just expect our users to want to grind through an epic eight-

hour raid encounter or treat these games like it's a second job. We need to make sure our games are just as fun in smaller time increments."

Daybreak has itself been through changes of late. For almost 20 years, it was known as Sony Online Entertainment, before it was sold to private equity firm Columbus Nova for an undisclosed sum in February. and is now facing the future without the weight of the Japanese giant behind it. *H1Z1* has fared well so far, though, having shifted around a million copies since its launch in January while still going through a process of refinement – a recent update has added female character models, and Daybreak has plans to bring even greater diversity to the game's character customisation in the near future.

You can find out more about H1Z1 at www.h1z1.com.

Incoming

Avalanche Studios, a purveyor of anarchic sandbox experiences, has two titles to look forward to in 2015. We covered the first, *Mad Max*, last week, while *Just Cause 3* is due for release in September.

That latest entry in the studio's hilariously over-the-top action series – where hanging on to the wing of a fighter jet or surfing on the bonnet of a truck – is a common occurrence now has its first gameplay trailer (youtu.be/qHd7exfcQ4Q) showcasing the sequel's more-is-more approach. The explosions are bigger, the destruction physics more detailed than ever, and the hero's grappling hook can now be used to tether up to five objects together – so if you feel like hanging a few cars from a helicopter, or pulling a plane out of the sky by hooking it to the back of a bus? It's all in a day's work for series hero Rico Rodriguez.



▲ Rico Rodriguez is back for *Just Cause 3*, the sandbox sequel where hijacking a fighter jet in mid-flight is a common sight.

AD INDEX

2/3 CCL	23 ENTALive
6/7 Morgan	25 Mesh
11 Box.co.uk	29 Pure IT
13 Sapphire	31 TP Link
14/15 PC Specialist	115 TheQuickClick
18/19 Aria	116 Fasthosts

To advertise contact Karl Taylor
 t: +44 (0)20 7907 6706
 e: Karl_Taylor@dennis.co.uk

NOTE TO ADVERTISERS

Micro Mart © Dennis Publishing, 30 Cleveland Street, London W1T 4JD. Company registered in England No 1138891. This publication may not be reproduced or transmitted in any form in whole or in part without the written consent of the publisher. Quotations for re-prints or other use of material are available on application.

THE BUSINESS ADVERTISEMENT DISCLOSURE ORDER 1977 (effective from 1st January 1978) requires all advertisements by people who seek to sell goods in the course of a business to make that fact clear. It is the responsibility of the advertiser to comply with the order. Lineage trade ads in Micro Mart carry this *T symbol. It is an offence for which you may be prosecuted not to advertise the fact that you are a trader.

MICRO MART is published weekly by Dennis Publishing. Subscriptions rates available on request. Micro Mart welcomes the submission of articles and reviews for publication. Please enclose a stamped self addressed envelope; otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Dennis Publishing will be on an all-rights basis. Views or opinions expressed by freelance contributors are not necessarily those of Dennis Publishing. Advertisements and goods/services offered are the sole responsibility of the particular advertiser and Dennis Publishing cannot be held in any way responsible. Whilst every care is taken the publishers cannot be held legally responsible for any errors in articles or advertisements or any resulting unsatisfactory transactions. We will however investigate incidents on a written complaint. © Dennis Publishing 2006. This publication may not be reproduced in or transmitted in any form in whole or in part without the written consent of the publishers. ISSN 956-3881. Blimey.

'THE BEST BOOK EVER WRITTEN ON HOW TO GET RICH'

J. Disorobo, Amazon.com

This is a book about getting rich. It's different from any other book on the subject because Felix Dennis made himself rich.

Very rich indeed.

And now he's going to show you how to do it!



THE CRITICS

'If this book doesn't get you rich, nothing ever will'

Mail on Sunday

'Well-founded advice based on hard-won experience'

Financial Times

'Full of honest insights. I strongly recommend this book'

Sunday Telegraph

THE READERS

'An inspirational book'

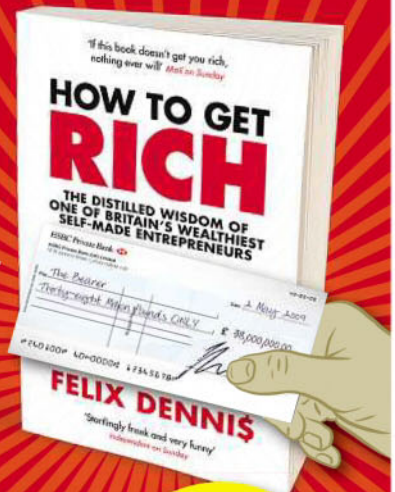
Alan Bates, Amazon.co.uk

'Essential reading. A great work'

Tom Rubython, Amazon.co.uk

'A true masterpiece'

'The Wanderer', Amazon.com



PAPERBACK EDITION OUT NOW £7.99

AVAILABLE NOW AT BORDERS AND ALL GOOD BOOKSTORES

www.randomhouse.co.uk/howtogetrich
www.felixdennis.com

'WISE, FEARLESSLY FRANK AND TRULY INSPIRATIONAL'

Mail on Sunday

FREE Private Classified Adverts



ONLINE

Visit our website, register and submit your classified advert at www.micromart.co.uk
Your advert will not only appear in our magazine, but be live on our website too!



POST

Simply fill in the form & post to:

Emma Corbett, Micro Mart, 30 Cleveland Street, W1T 4JD

◀ **NEW ADDRESS!**

Step 1

Write the wording for your advert in the numbered boxes below (one word each box). Maximum 30 words free.
Please complete in BLOCK CAPITAL LETTERS, then proceed to Step 2

1	2	3	4	5	30 Words FREE Private Ads Only Trade ads MUST be boxed or reversed	Boxed		Reversed		
6	7	8	9	10		Private	Trade	Private	Trade	
11	12	13	14	15		£6.80	£13.60	£8.00	£16.00	
16	17	18	19	20		£1.70	£8.50	£17.00	£9.70	£19.40
21	22	23	24	25		£3.40	£10.20	£20.40	£11.40	£22.80
26	27	28	29	30		£5.10	£11.90	£23.80	£13.10	£26.20
31	32	33	34	35	£6.80	£13.60	£27.20	£14.80	£29.60	
36	37	38	39	40	£8.50	£15.30	£30.60	£16.50	£33.00	
41	42	43	44	45	£10.20	£17.00	£34.00	£18.20	£36.40	
46	47	48	49	50						
51	52	53	54	55						
56	57	58	59	60						

Step 2

Choose a category you would like your advert to appear in and tick the box.

- Hardware for sale Software for sale General for sale Accessories
 Hardware wanted Software wanted General wanted

Step 3

Complete all fields of your personal details and payment method.

Name

Address

Post Code

Landline Telephone No. Email

If I have more than 30 words, I have enclosed due payment. I am not advertising pirated, pornographic or any other kind of illegal software and my advert is both honest and legitimate. MM reserves the right to refuse or alter adverts at the discretion of the management. MM cannot be held responsible for the condition or quality of goods advertised. Your advert will be processed on receipt and will appear a.s.a.p. subject to space and availability.

Please tick appropriately Private Trade

I enclose payment by Cheque Postal order

or please Debit my Mastercard/Visa/Amex account No

Expiry Date:



FAX this completed form to: 0207 907 6066

Authorise payment for £

Please Note: The standard Micro Mart conditions of advertising acceptance apply to all classified advertisements. Cancellations and amendments are not accepted to free ads. The publishers may refuse any advertisements and cannot guarantee insertion into any specific issue. Dennis Publishing will use your information for administration and analysis. We may share your information with carefully selected 3rd parties. We, or they, may send you details of other goods or services which may be of interest to you. The information may be provided by letter, telephone or other reasonable means of communication. If you do not want your details to be shared with carefully selected 3rd parties, please tick here.

IT Essentials

TO ADVERTISE CALL

KARL TAYLOR

0207 907 6706

karl_taylor@dennis.co.uk

or JOE TEAL

0207 907 6689

joe_teal@dennis.co.uk

FILCO

The best keyboards in the world.

Available from

www.keyboardco.com

0845 205 5555

**Today's news
today, not a
week later**

- Breaking IT news
- News that matters to UK IT decision makers
- Updated throughout the day



IT news as it happens, online now at
www.itpro.co.uk

www.bit-tech.net

THE LEADING DESTINATION FOR PC ENTHUSIASTS & hardcore GAMERS

bit-tech.net

MAGBOOK

Build your own Android App

EXCLUSIVE

40%
OFF

Basic4Android



Create your own game

Step-by-step advice

How to make money



ONLY
£9.99

ON SALE NOW

Order your print or digital MagBook
at magbooks.com

To place an ad in our classifieds, simply fill in the form at www.micromart.co.uk or send your ad by post to Maaya Mistry, Micro Mart, Dennis Publishing, 30 Cleveland Street, W1T 4JD

HARDWARE FOR SALE

Have you got any old kit lying around you'd like to get rid of? Fancy making a few pounds while you're at it? Why not advertise in the Micro Mart classifieds? It's easy and it's free, just email what you've got, how much you'd like for it, and your contact details to micromartclassifieds@gmail.com, and we'll do the rest. There are thousands of readers out there looking for components every week, and you may have something unwanted they've been searching for – so get in touch and save your kit from going to the tip!

IBM Thinkpad T30 laptop for spares or repairs. Excellent condition, but does not bootup. Not sure why. Could be an easy fix or for parts/spares. £15 plus P&P.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Webcam (Trust Spacecam). Boxed with CD of installation software and instruction manual. Perfect condition. £10.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

HP Photosmart C4585 All-in-One multifunction colour printer. Perfect condition. Includes software and manual. £20.00
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Laptop Hard Disk Drive. Fujitsu. 20GB. Excellent condition: £10.00.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

ASUS P5QL-EPU Motherboard - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £45 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

PC Desktop Ram (DIMM) Memory. Siemens PC100 - 222- 620 16M x 64 SDRAM. HYS64V16222GU-8 Only £8.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

PC Desktop Ram (DIMM) Memory. 64MB Siemens PC100-322-620 MT8LSDT864AG-10CZ5 - Only £8.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Western Digital Cavier SE Desktop Hard Disk Drive 160GB. Perfect condition. Only £10
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Asus Z97 Gryphon Armor Kit. Steel backplate with plastic top and auxilliary fan. Also some minor plastic bits. £20. Email for more details.
Email: graham_rocknell@yahoo.co.uk

Netgear DG834N Rangemax Next Wireless N Modem Router kit. Excellent condition complete with power supply, network cables, telephone cable, ADSL filter and setup CD. £10.00.
Tel: David Ewles (01295) 253554
Email: david@ewles.gb.com

Laptop for sale. Toshiba Portage i5 2.5GHz Model R830-13c 4GB RAM, 320GB HDD. Wi-Fi, fingerprint scanner, HDMI output. Sold on eBay for over £200; only £150 plus £15 p&p. Bargain. Great condition. Very light.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

LAPTOP HARD DRIVE. 160GB SATA 2.5". WESTERN DIGITAL. Model: WD1600BEVT. Fully tested. Perfect working order. Partitioned and formatted NTFS. Free postage. Price £22. Paypal accepted.
Email: geofry@tiscali.co.uk

DESKTOP HARD DRIVE. 640GB Western Digital 3.5" SATA model WD6400AAKS. Perfect working order. Partitioned and formatted. Only used as back-up drive. Free delivery. Price: £33. PayPal accepted.
Email: geofry@tiscali.co.uk

Vintage Amstrad PC1512 HD20. Colour Monitor 20MB Hard Drive 5.25 Floppy Original Amstrad Disks Manuals spare Keyboard and Mouse. This is a rare fully functioning collectable. £60.
Tel: (01949) 876235
Email: hc4203@gmail.com

4x 1GB DDR2 Ram (OCZ Nvidia SLI PC2 6400 epp 4-4-4-15). £40.00 for all 4 + Post/Packing. Perfect working order.
Email: ken.toole1@virginmedia.com

Seagate Barraucda 250GB SATA Hard Drive 3.5". Tested and removed from a working environment. £12 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

Corsair Vengeance 16GB (2x 8GB) DDR3 Memory CMSX16GX3M2A1600C10. Never used but box opened. Selling due to wrong voltage, these are 1.5V and I needed 1.35V. Asking £85.00 inc. postage to the UK.
Email: fabstock1@gmail.com

4x 1 GB DDR2 RAM (Ocz Nvidia SLI PC2 6400 epp 4-4-4-15) for Sale. £40.00 for all 4 + Post/Packing. In perfect working order.
Email: ken.toole1@virginmedia.com

HP Microserver n40l / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated, & completely updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/ coa's. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five hard drives.

See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/ Islands. Payment by Cheque O.K subject to clearing, Paypal at £25 additional. (to cover their fees).
Tel: (07794) 528857
Email it central@ntlworld.com

Used Asus Wireless Router for sale. Dual-band 4 x GB Ethernet Wi-Fi RT-N66U N-900. £65.00 O.V.N.O. Selling cause I have no need for it since upgrade to BT Home Hub 5.
Email: beme12355@googlemail.com

SKY PLUS and SKY PLUS HD REMOTES. Original £7.50 + P&P please email or call me for more information.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

US Robotics External 56K Message Modem. Includes V.90 56K Standard X2 Technology. Boxed and complete. Perfect condition. £25 + p&p.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

2 x 2GB DDR3 1600 MHz RAM. Recently taken from a 2012 mac mini. As new £25.
Email amstereofan@gmail.com
XFX GeForce Nvidia 8800Gts Graphics Card for Sale. £40.00 + Post/Packing. Perfect working order.
Email: ken.toole1@virginmedia.com

XFX GeForce Nvidia 8800Gts Graphics Card For Sale. £40.00 + Post. In perfect working order
Email: ken.toole1@virginmedia.com

Custom Built modified watercooled gaming desktop. i5 4670K, R9 280X, Silverstone RV-01 USB3, 1000W PSU: parachord sleeving, Z87M OC Formula, 8GB Kingston Fury 1866MHz, 180mm and 120mm Radiator. Mods, Yellow and Black colour scheme! No Storage. Email for pics and info. Buyer collect: Gloucestershire. £800 ono.
Tel: Adam (07426) 874117 Email: flaming_monkey95@hotmail.co.uk

Asus A8V motherboard, socket 939. Clips holding CPU cooler broke, CPU overheated & shut down. M/B should be OK and there is 4GB of ram on board. Free, collect only. North Wales. Tel: (01286) 678584
Email: gw7hav@googlemail.com

Kingston HyperX 2x2GB DDR2 1066MHz RAM. Tested and removed from a working environment. £45 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

CPU sale. Intel Core 2 Duo E4400 2.0GHz £10, Intel Pentium 4 630 3.0GHz £7, Intel Celeron M 350 1.3GHz £5, Intel Celeron Mobile Dual core T1500 1.866Ghz £6, Intel Pentium 4 630 HT 3.0Ghz 2MB cache £8, AMD Athlon 64 3200 £5 Athlon 64 3500 £6 Athlon 64 3200 Dual core £10 postage £2.
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

2 x 512MB PC3200 DDR400. These two sticks were removed from my working system, now redundant. £5, plus £1 P&P.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

DDR2 memory sale. 2 x Nanua PC2 3700 256MB £6 pair, 2 x HP PC2 4200 256MB £7 pair, 4 x HP PC2 4200 512MB £10 pair or £18 for four.
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

Asus M2N2-SLI Deluxe motherboard bundle. With AMD Athlon 64 4000 CPU, 4Gb Corsair ram, fan, backplate, manual, driver CD. £40
Email: david.white38@ntlworld.com

IBM/LENOVO SFF BASEUNIT. P4/ 2.8 H-T, 2GB RAM, 40GB Hard Drive, CD-Rom, 10/100 Network, sound, USB, Clean install XP-pro, fully updated, Office Suite, Anti-Virus, & all usual utilities, COA Licence Sticker & Install media, £25
Tel: Pat (07710) 348638
Email: pat4cars@aol.com

FUJITSU-SIEMENS MINITOWER. Pentium D 2.8 Dual-Core, 2GB RAM, 80GB Hard Drive, DVD-RW, Gigabit network, sound, Clean Install XP-pro, fully updated, Office suite, Anti-Virus & all usual Utilities, Legal COA sticker & System Image. £35
Tel: Pat (07710) 348638
Email: pat4cars@aol.com

DELL OPTIPLEX GX240 SFF. P4/1.6, 20GB hard Drive, 768MB RAM, CD-Rom, 10/100 network, Sound, Front USB, Clean install XP-pro, fully updated, works OK but slow by modern standards, £15.
Tel: Pat (07710) 348638
Email: pat4cars@aol.com

LG Flatron W2246S 22" monitor with power and VGA leads. No dead pixels in very good condition. £50 Buyer Collects (Verwood, Dorset)
Tel: (01202) 826057 Email: geoffandcynth@themailspot.com

CD Optical Drive for installation in desktop PC Only £10.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

Very rare Viking IBM 16MB Dram Card (15109 66G5109) for Compaq, IBM Thinkpad, Etc Laptop Only £20
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

TP-Link 54Mbps 4 port Wireless G Router. Perfect condition and boxed. Model: TL-WR340G. £20.00 plus postage.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

Intel Core 2 Duo E4600 3GHz 775 Socket Processor. Tested and removed from a working environment. £10 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

Addon Wireless LAN USB 2.0 54Mbps 802.11g Adaptor. Boxed with instructions and software: £9.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

CD Stomper CD/DVD Labelling System: Software, Labels and Label Applicator. Boxed. Unused. £9.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

56kb Fax Modem External. £10.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

DIR-615 Wireless N Router. Boxed, brand new. £30.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

2x 1GB PC2100-648. These two matched sticks were removed from one of my redundant systems. Plus one PC2700 (DDR 333Mhz) and one 512Mb PC3200 DDR400 stick. All for £5 plus £2 P&P.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

Laptop DDR2 memory sale. 2 Corsair Value Select 533mhz 1GB £18 pair, 2 Hynix 800mhz 2GB £26 pair, 2 Generic 533mhz 1GB £15 pair, 1 Generic 800mhz 1GB £10, 1 Nanua 666mhz 1GB £, 1 Samsung 666mhz 1GB £8. Postage included
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

Two 120GB Maxtor DiamondPlus 9 Drives plus one 80GB DiamondPlus 10. Can be supplied with two plug-in caddies. No reasonable offer refused.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

HP Elitebook 8760w i7 2820QM @ 2.2GHz 32GB RAM 750GB HDD Quadro 4000M GPU. Only 2 small marks on whole machine. Cost £3500 when new. £900 ONO
Tel: (07772) 926632
Email: stedaley19@gmail.com

WD 2TB desktop hard disk. Formatted ready for an OS. Runs very nicely. New laptop means my desktop items must go! £40 includes free tracked postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

Toshiba C500D-B-11 laptop. Virtually new cost £279 will accept £150 O.N.O.
Tel: (01217) 535324

Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
Tel: Tim (01623) 624509 Email tim.stirland@btinternet.com.

Amstrad PcW 9256 in good working order with software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Asus P8Z68-v LX socket 1155 motherboard. Original box 1/0 cover user guide driver disk fitted core i3 2100 CPU 3-1GHz and 8GB PC1300 memory. No fan. Working fast and fine. £125 + free postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

ASUS P5B Motherboard - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £35 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

SAMSUNG GALAXY Tab 3 for sale. 2mths old, 8GB, wi-fi, £80 open to offers. Willing to post at a charge.
Tel: Christine (01386) 831836

SoundBlaster Audigy SE 7.1 soundcard for sale. Perfect working order. Selling due to not being needed any more. Just £12 plus postage.
Tel: Ian (01132) 629028
Email: ianmatthewuk@yahoo.co.uk

Asus p8h61-mle motherboard socket 1155. Original box 1/0 cover driver disk manual together with Celeron 91620 dual core CPU and 4 9195 pc1300 memory. Working fine. No fan. £70 + free postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

Toshiba Satellite SA60 laptop. Model PSA60E-092058EN. Windows XP Home Edition with Certificate of Authenticity. For spares or repair - broken power connector on mobo. No power cord. Otherwise in very good condition. £40.00 + p&p
Tel: Peter Scarth (01452) 372350
Email: pscarth@blueyonder.co.uk

Apple Touch 32 GB iPod. Virtually new cost £199 will accept £100 O.N.O
Tel: (01217) 535324

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Amstrad PcW 9256 in good working condition with software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Panasonic KX-P7105 mono laser duplex printer. Some toner left. Up to XP only – hence £25. Buyer collects from N2, East Finchley
Tel: (02083) 431527
Email: pnnikiel@gmail.com

Amstrad PcW 9256 in good working condition w/ software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

GEFORCE 1GBYTE 24- PCI express PC card. HDMI DVI VGA PC video card. £10 plus p&p £4.50. 2 for sale. £10 each.
Tel: (01707) 339063
Email: awhishaw@aol.com

HP 4GB memory Microserver with two hard disc drives. £110. One with Linux MINT. Other with Linux FreeNAS. This will also run Windows 7 and Windows Server or Home Server. (Win 8 I've not tried it) Two spare HD slots with appropriate caddies. Slot for your SATA DVD drive also, (or use external usb or DVD drive if needed. four usb sockets on front, two on rear. VGA, network, power sockets on rear. Supplied in original HP box with CD and leaflets etc. Collect from Harrogate, North Yorks, or posted via Hermes for £12 (or less if I can do it cheaper). Cash on inspection

and collection (Highlands and Islands might obviously cost more to be delivered).
Tel: (01423) 872045
Email: it_central@ntlworld.com

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

EPSON PRINTERS T715 12 multipack F.O.C. to good home, just pay postage £2.50. (Tesco equivalent original cartridges £120 current special offer!) Perfect crisp printing etc.
Tel: Pete Dew: (07526) 988594

EPSON PRINTERS T711 6 multipack F.O.C., just pay postage £2. Perfect crisp printing etc. May have others F.O.C. if model older than 12 months.
Tel: Pete Dew (07526) 988594

Lexmark Printer Z601, still working and in good condition, £25.
Tel: (01386) 832758

Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
Tel: Tim (01623) 624509
Email tim.stirland@btinternet.com.

Apple Mac G4 Tower. 400MHZ cpu, 640MB Ram, 2xHardDrive 40GB,20GB. DVD & ZIP Drive. OS X v10.3 Panther+OS9. NO KEYBOARD OR MOUSE. £25 ono Buyer collects
Tel: (07941) 254296
Email: jasonnd@hotmail.com

Wireless Motorised IP Surveillance Camera. White In Colour - Control from your mobile phone/tablet/pc when out of the home - ideal for home security, baby monitoring, has sound and remote recording etc BNIB - £25 Price includes post and packing.
Email:omendata@gmail.com

Dell Inspiron 660 Intel i5 QUAD CORE with ACER 23 Inch LED monitor. AS NEW. Operating System: Windows 8.1. MPN:620MT. Memory (RAM): 4 GB. Hard Drive: 1TB. Processor Type: Intel Core i5. Primary Drive: Optical DVD+/-RW, Processor Speed: 3.0 GHz, Features: Graphics Card GT620 1GB. Acer LED monitor 23” HD. £520
Tel: Hitesh Rao (01163) 198895

PRINTER CARTRIDGES. Suitable for Epson printer range T711 - T714. Work perfectly. 50 pence each, plus postage (brand new unused sealed). Over a dozen available.
Tel: (07541) 222678
Email: petedew@gmx.co.uk

PRINTERS T481-T486 6 multipack F.O.C. to good home, just pay postage £2. Perfect crisp printing etc.
Tel: Pete Dew (07526) 988594

INKJET CARTRIDGES suitable for Epson Printers T711 - T714 range, and T481 - T486 range. 79 pence each, plus postage. Work perfectly, good crisp printing quality.
Tel: (07526) 988594
Email: petedew@gmx.co.uk

Powered PCI Express x1 To x16 Riser Card Extension via USB 3.0 + Power Cable Adaptor. Allows you to add an extra Pci-ExpressX16 slot to your Pc converting an existing x1 slot to x16. Useful for adding an Extra graphics card to create a Crossfire triple configuration or for Bitcoin data mining up to 7 cards can be installed using these adaptors. Quality model - Brand new still boxed. £10. Price inc. P&P
Email:omendata@gmail.com

Laptop Removeable drive tray. Allows you to add an extra hard drive to your laptop by taking out the CD/DVD drive. This device inserts into the Cd/Dvd Empty Slot and holds 1 Hard Drive. Excellent Engineers Gadget - Great for data recovery or just beefing up. Two types available - standard Sata To Sata or Sata To Ide (Pata) Slot type. Brand New Still In Box. £20.
Email: omendata@gmail.com

Amstrad PCW 9256. In perfect working order including on-top printer with a few 3" disks. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

2 HP Laserjet 3100 printer-fax-copier-scanners. In good working order. £25 each.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Lian Li PC-X2000 Computer Case. Supports mATX, ATX, eATX; hot swap SATA drives, six 3.5" & two 2.5" hot swap disc holders. Three 140mm intake plus two 80mm and one 140mm exhaust fans. £140.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

1.5TB SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £40 including P&P
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

1TB SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £38 including P&P
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

Blueberry I-MAC. Good condition, all in working order, £55.
Tel: (01386) 832758

2TB Western Digital SATA drive. Model WD2002FYPS 64mb cache, fully refurbished by government acknowledged company. All data taken off (some drives are still under WD warranty) ONLY £50 including P & P
Tel: Dave Thomas (01942) 706572
Email: davethomas96@aol.com

Lexmark Portable Photo Printer P315 model. New, boxed, unused. £30.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

WANTED: Fractal Design Define XL full tower case. R1 (original version) in black.

Tel: (01670) 860146

Email: mm@tectron.co.uk

WANTED: Working Dot Matrix Printer in Good Condition. Thanks!

Email: printer.20.odaily@spangourmet.com

WANTED: Acorn computer either an A5000 or A7000. Also book on teaching yourself binary.

Tel: (07817) 861011

Email: Johnhaviiland73@gmail.com

WANTED: Corsair PSU cable bag. Please email me if you can.

Email: Paul@planetvoodoo.co.uk

Wanted: HD 3850 Graphics card, must be AGP. Tel: (07817) 861011

Wanted: Fully working mainboard for AMD socket AM2+/AM3, micro ATX size. Must use DDR2 RAM.

Tel: Brian Taylor (07570) 452557

Email: bmorgant@yahoo.co.uk

SOFTWARE FOR SALE

Do you have any old software that you simply don't use? Why not advertise it with us and see if anyone else can make use of it - you may well be surprised to find that someone is looking for exactly what you don't need!

PCB design software 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99

Tel: Nigel Wright (07967) 527693

Email: cresswellavenue@talktalk.net

Cyberlink PowerDVD 12 Standard. Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50

Tel: Ian (01932) 856971

Email: a2345@btinternet.com

Microsoft Office 2013. Original Software only £100.

Tel: Gordon (01314) 660205 E-mail: scobie09@gmail.com

Windows 7 Ultimate 32-bit version . NEW software and license (certificate of authenticity) 100% genuine and unopened software .ONLY £45 including P&P.

Tel: Dave Thomas (07828) 982930 or (01942) 706571

Email: davethomas96@aol.com

Sim City 2000. Boxed and original. Classic gaming. £15.

Tel: Gordon (01314) 660205 E-mail: scobie09@gmail.com

Windows 2000 Professional. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £15 including P & P.

Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Windows Vista Business. New and sealed. software and license (certificate of authenticity) 100% genuine and unopened. (Dell branded but will install on any machine) ONLY £15 including P&P

Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Windows 7 Home Premium 32 bit versions. NEW software and license (certificate of authenticity) 100% genuine and unopened software .ONLY £35 including P & P.

Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Nuance Omnipage 18. OCR Runs under Windows 8, 7, Vista or XP, Original CD with unused product key £25.

Tel: Ian (01932) 856971

Email: a2345@btinternet.com

Acronis True Image Home 2012. Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.

Tel: Ian (01932) 856971

Email: a2345@btinternet.com

Windows 7 ULTIMATE 32 Bit and 64Bit DVD disks incl. SP1 This is my "Get Genuine Kit" from Microsoft not OEM. New install or legalise your copy with full Product Key. only £50 incl. reg. post

Email: Dave_ochdgh@aol.com

Norton Family Premier 2.0. Runs under Windows 8, 7, Vista or XP, Original Symantec unused product key £15.

Tel: Ian (01932) 856971 Email: a2345@btinternet.com

Microsoft Office 97 Professional. Original disc with key £18 inc postage.

Tel: Andrew (01376) 512118

Windows XP Professional. New and sealed. Book, software and license (certificate of authenticity) 100% genuine and unopened. (Dell branded but will install on any machine) ONLY £15 including P&P.

Tel: Dave Thomas (07828) 982930 or (01942) 706571

Email: davethomas96@aol.com

Microsoft Office Small Business Edition 2003 with Business Contacts. Legitimate Office Small Office Business Edition comprising Word, Excel, Powerpoint, etc. Comes with small piece of OEM hardware and original license code (coa) £10 incl. delivery, cheque or PO. £10.50 by Paypal.

Tel: (07794) 528857 Email: it_central@ntlworld.com

Norton Utilities 16 for 3 PCs. Runs under Windows 8, 7, Vista or XP, Original Symantec CD with unused product key £12.50

Tel: Ian (01932) 856971 Email: a2345@btinternet.com

SOFTWARE WANTED

Wanted: LG GSA 2164 D software disc to replace broken original.

Tel: Glen Fremantle (01387)248976

Email: bldamsys@yahoo.co.uk

Wanted: Windows 98 CD ROM operating system with boot disk, instruction manual and serial number. Tel: Craig (07867) 930265 or 01912093677

Email: craigtin44@hotmail.com

IMPORTANT BUYING ADVICE

We work very hard to police our classified ads, and make them as secure as possible. However, please do your bit too and use the following guidelines:

- **Never - NEVER** - pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.
- Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk
- Keep copies of all correspondence
- When sending out goods, at the least obtain a certificate of posting from the Post Office

If you are in any doubt, feel free to send us a mail via editorial@micromart.co.uk.

Every year, thousands of successful transactions take place through our classifieds, and that's just how we like it.

Help us help you keep them one of the safest and most secure places to buy and sell computer kit.

ASK AARON



Meet Aaron Birch. He's here to help you with any general upgrading, software and system building problems. He's got advice aplenty, and you're very much welcome to it!

Send your questions to:
Aaron Birch
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Language Barrier

After switching to Google Chrome, I noticed that it seems to have some very good features, particularly the ability to spell check pretty much everything you type into it, no matter where you are. As someone who needs this kind of feature, as my typing skills aren't all that good, it's a very welcome tool, which I use all the time.

The problem I have, however, is that the language used doesn't check for UK spellings, and it's instead locked to American English. Now, I happen to like my usage of the letter U in words, so I was hoping to be able to change this to check for UK English, but I can't seem to find out how to do it. I was hoping you could explain. Thanks in advance.

Norm

Chrome's spell checker is a great feature that's available most of the time, and it can be a great help when typing out such things as Facebook statuses or forum posts that don't have their own spell check, but being an American program, the default language used is usually US English.

The easiest way to change this is to right-click within any text field, including Google's search box, and click on 'Spell-checker options' and select 'Language settings.' Alternatively,

you can go into Chrome's main menu and then go into Settings and click 'Show advanced settings'. Now, click 'Language and input settings' found under Languages.

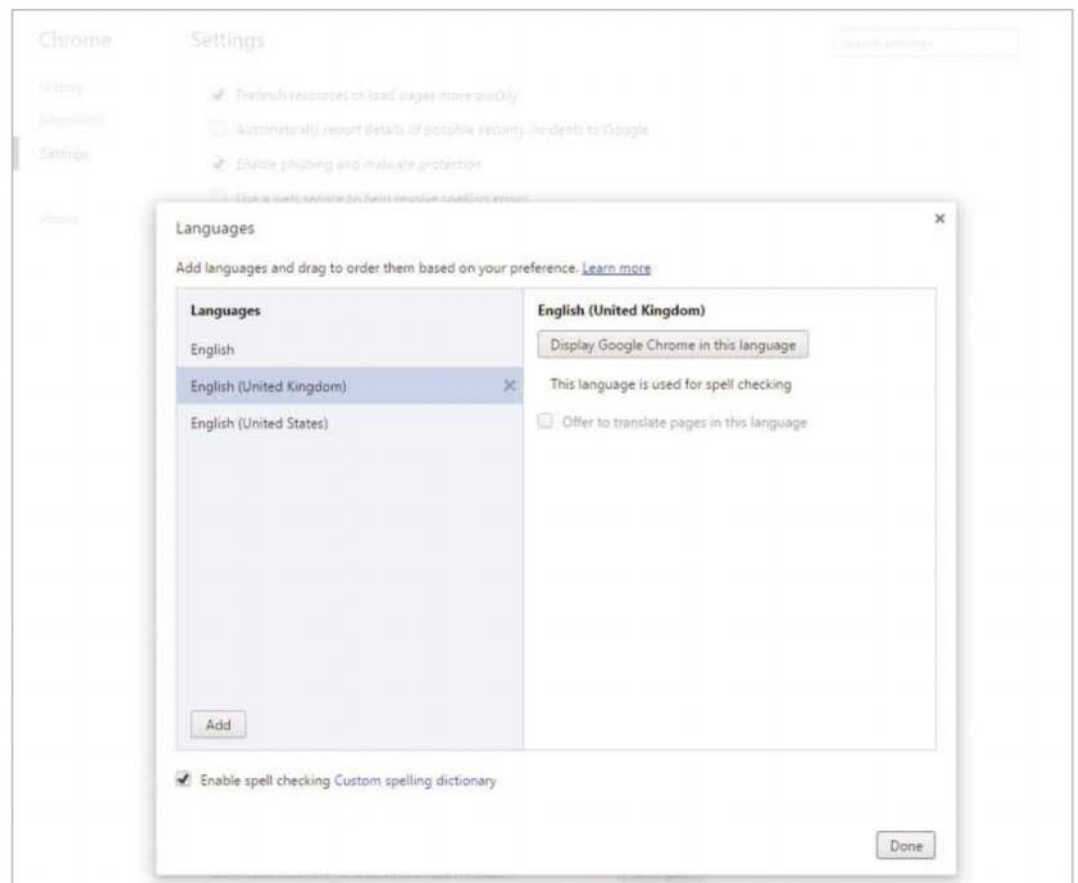
In the new windows that opens you can see the available languages, and you can click the Add button to add another. Do this, and select 'English (United Kingdom)' from the list. When this is done, click to delete the US

“ Chrome's spell checker is a great feature ”

English option, and highlight the UK option before clicking the button to use the language for spell checking. You can also opt to use this language to display everything in Chrome.

Once this is done, close the options and use the browser as normal. When you now type into various input boxes and the like, Chrome will use a UK English dictionary to check your spelling.

▼ Google's Chrome browser has some great features, including built-in spell checking



Unstable Laptop

My laptop has started to become very unstable and often runs very slowly and/or hangs. The hanging issue is a pain, but is not all that common. The slow down, on the other hand, happens all the time, and it's making my use of the system almost unbearable.

I'm not sure why it would begin to run so slowly, as I've not done anything to it that I would imagine can upset it. I also don't do a great deal of intensive work with it, which I understand can cause system slowdowns. It's a fairly new system, which you can see from the information I attached in my email, and I don't really understand what's going on and why it's running the way it does. I hope you can help.

Pete

I don't have room here to print the very detailed information you sent over, which I assume is from a system analysis program,

but I can see that your laptop is, indeed, fairly new. One thing that was immediately apparent is the lack of disk space. Your system shows a total capacity of 1TB, which you've partitioned into three drives. One of these is full, with only a few megabytes of space, and the other two have around 10% space left on each.

This will undoubtedly cause your system to run slowly, as there's simply no room left for Windows to utilise when running programs or for the swap file to properly function. This lack of resources will greatly slow your machine down and will also contribute to your system's instability.

The best course of action here is to tidy up your system and back up data to another, external source. Give your laptop a full spring clean, uninstalling programs you don't need and freeing up a ton of disk space.

I'm not sure what you have taking up all of this space, so you'll need to decide how you trim down the data. Once you've done

this and freed up a good deal of space (on each drive), your system will then start to run more reliably, at faster speeds.

This is a good tip for anyone else noticing their PC's sudden lack of speed. Always check to see that your hard drives aren't overly full and ensure you have plenty of space left over. A full hard disk will almost always cause some sort of problem, so keep them as tidy as possible.

▼ **Low disk space can cause all sorts of problems for any PC, so be sure to keep your storage in check**



SPDY?

I've begun to see a rather strange thing appear on my PC, and I was hoping you could help me find out what it is and if it's a danger or not.

When I'm browsing the internet, I've started to notice a notice appear on screen that says, "This page loaded by SPDY." I have no idea what SPDY is or how it got onto my PC. And, as far I was aware, it was my browser that loads pages.

Do you know what this SPDY is and what it's doing on my PC? If it's dangerous, how do I get rid of it? I'd appreciate any help you can give. I use Google Chrome.

Ty

You can relax a little bit, Ty, as this isn't anything to be worried about. It's not a virus or anything bad but is instead a Google tool designed to speed up browsing. SPDY (pronounced Speedy), is a network protocol that tries to speed up your web use.

It handles this by using various techniques, such as compressing requests, multiplexed requests and server tweaks to speed up server and client response, and it reduces the load on bandwidth and server round-trips. Simply put, it does things faster than your browser could without it. You can find out more at developers.google.com/speed/spdy.

Does SPDY make a big difference? It depends. People have reported only slight improvements for the most part, and I've yet to really observe much difference myself. Others haven't noticed a much better result. As for how it got onto your PC, it will have been installed with Chrome. You shouldn't really worry about it, though. It's also used by a range of browsers, not just Chrome.

Google is planning to phase out SPDY in early 2016, so you'll not be seeing this for too much longer. The company is apparently making a switch to HTTP/2. If you want to disable it anyway, you can do so by typing

► **Google's SPDY protocol is a common sight in many browsers, but benefits are varied from person to person**

▼ **SPDY can be disabled in Chrome via the flags menu**



'chrome://flags' into the address bar and disabling the SPDY option in the list.

On the other hand, if you or any other readers notice a program called SPDY-BUT.EXE on your system, be careful, as it's a known backdoor Trojan, so be sure to scan your system using both anti-virus and malware scanners.



ASK JASON



Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

Power Games

A friend recently introduced me to the Sust-it website – www.sust-it.net. If you don't know it, this tells you the annual running cost of various household appliances. There's a section for computers, and though my own laptop isn't listed, it's a close relation to the featured Dell Vostro 3549, a Core i5 machine. Sust-it says the annual running cost is £2.77. Does that sound right? Do modern laptops really sip so little power?

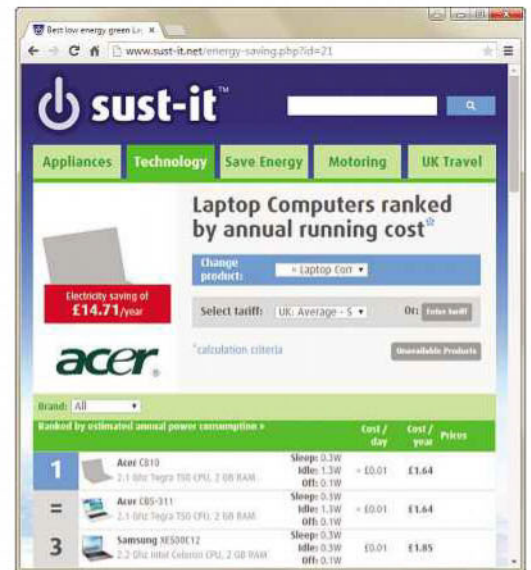
Nick, Gmail

I wasn't familiar with Sust-it till you mentioned it, Nick. It's quite useful, isn't it? Unless you want to know anything about computers, that is...

The site bases the running cost of a fridge freezer on 24 hours of usage every day. That sounds reasonable, and apparently you're typically looking at about £35 per year. Based on 280 programme cycles, the running cost for an average dishwasher seems to be roughly the same.

Unfortunately, the calculations for computers – towers, laptops, all-in-ones – must have been done on an abacus with most of the beads missing. As you say, the running cost of some models is pegged at under £3 per year (under £2 per year in a few instances), or less than 1p per day. Which is clearly nonsense.

The figures are based on the number of hours a machine spends in different modes: sleep, idle, and off. But where's the in-use data? It seems a laptop will cost under £3 per year just so long as you don't actually use it. Apparently, it'll also draw at least 0.1W even when off. How so? I can only think that 'off' here means 'standby', which is silly.



▲ Are these running costs realistic?

The site makes a better fist of it when it comes to monitors. In-use figures are given. But even here there's no mention of how many in-use hours are assumed per day. The running cost of some monitors is estimated at about £3 per year (sound familiar?), and I reckon for that money you'd just about be able to check each Wednesday's and Saturday's lottery results.

The upshot, Nick, is that Sust-it is clearly useful in some areas and utterly useless in others. Sadly for us, it's useless in the area of computers. A missed opportunity, for sure. You're right to be sceptical of some of the numbers. The guide on buying light-bulbs is excellent, however. And if that sounds sarcastic, it isn't meant to.

Bits And Pcs

This week I have been mostly...

...reading that a Chinese anti-virus company has been caught using a different detection engine in its review product to the one in its shipping product (see Tom's Hardware: goo.gl/ACcMYf).

...playing – still! – *Candy Crush Saga*, *Candy Crush Soda Saga*, and *Diamond Digger Saga* (I keep finishing the damned things and then King keeps adding new levels!).

...watching the election results from start to all-over-bar-the-shouting (I've been working at the same time, but, yes, I'm the kind of sad individual who'd have stayed up anyway).

...listening to the alarm at my new office clanging like the clappers of hell (it uses a contactless fob for arming and disarming, and it's so unreliable I'm having to resort to the old-skool method of punching in the code on the keypad).

...realising it really is about time I bought a wi-fi extender for the upstairs rear of my house (any recommendations?) – I have the devil of a job catching up on *Emmerdale* when the ITV Player keeps buffering

► Will it ever end? Please, tell me it'll end!



Turn It On Again

My computer's protected by a UPS (uninterruptible power supply). Do I assume the computer's PSU has a soft-start (a slowly rising output) and a soft-stop (a gently falling output), allowing it to be always left on? Or should I switch the UPS on first and then the PSU and, at the end of a session, turn the PSU off first and then the UPS? Even though I only buy major-brand PSUs, I've had three failures in barely as many years (one even took out a UPS).

Jonathan N Palmer, Gmail

This is beyond my area of expertise, Jonathan, so I'm putting it out there for other readers. Write in with your views, please, friends and neighbours. Personally, I can't think it makes a jot of difference what's switched on or off first. In fact, the only time I switch a tower or laptop off at the mains is when I'm going away on holiday – and I suspect I'm not alone.

I'm mystified about the loss of so many PSUs, however. Surely the UPS won't even be in the picture unless there's a power outage? How could it affect the longevity of a PSU? I'm out of my comfort zone here. I feel there's something I'm overlooking. Are you seeing a lot of power outages? Are you getting a lot of spikes?



▲ Can a UPS cause this?

Bundle Of Joy

I've just bought a Samsung NX3000 camera. It's one of these new mirrorless jobs – a bit like an SLR but with the size and weight of a compact. It's terrific – a steal at £200 – and it came bundled with a copy of Photoshop Lightroom 5. I've no use for this, though, so could I resell it? The disc has 'not for resale' (or similar) printed on it – is that legally binding? I don't want to get into trouble if I put it up on eBay.

S Stratton, Warwickshire

My understanding is that it isn't legally binding in the least. 'Not for resale' labels on products aren't meant as legal threats (though manufacturers might like us to believe that); they're intended to put off potential buyers and therefore discourage retailers from offering such products for sale. I'm no legal expert, of course, so please don't take my word for it. The Trading Standards Blog – 'A blog by a Trading Standards Officer on Trading Standards issues,' to quote the site's owner – has an interesting discussion on the subject: goo.gl/vuwcyR.

Manufacturers of multi-pack food products can often be quite crafty. They put the list of ingredients on the outer box and leave it off the individual items. Those individual items are then illegal to sell, as all food products sold in the UK have to include an English-language list of ingredients. That doesn't apply to a piece of software, naturally. Although maybe it should, as I'm allergic to anything with Apple in it.

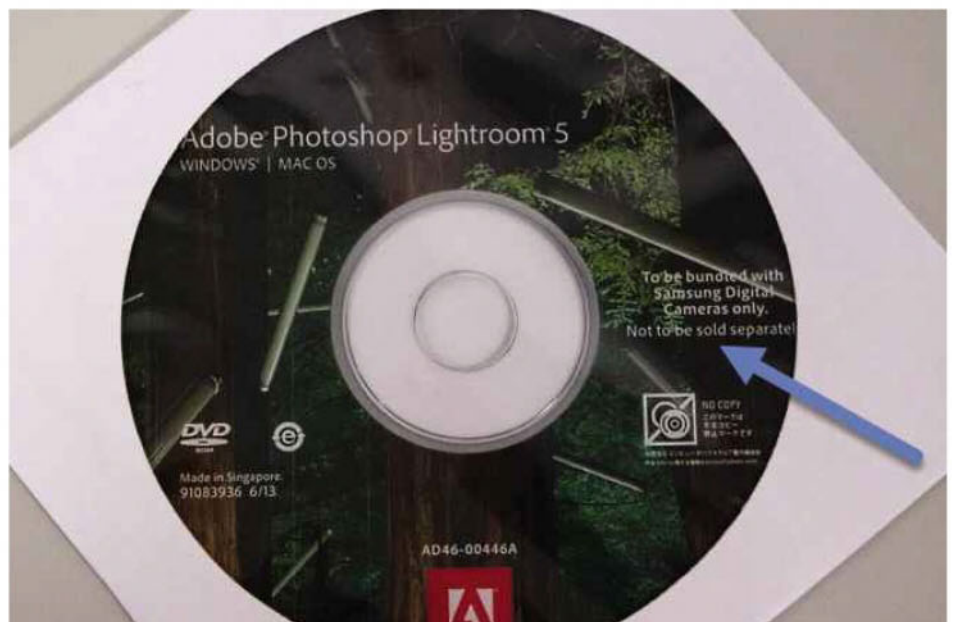
Would eBay kick up a stink? Possibly. Its enforcement of VeRO – the Verified Rights Owners programme – can be somewhat random. However, I've just had a butcher's, and numerous people are selling or have recently sold 'not for resale' editions of Lightroom 5, often with that key phrase clearly shown in photos. Some sellers openly declare they're flogging off discs bundled with cameras. So I'd say you're good to go. Indeed, I've sold things this way myself, with no repercussions.

It looks like Lightroom 5 on eBay sells for about £60. If you can bring that home

*and reduce the overall cost of the Samsung NX3000 to £140, very well done. It's a superb MILC or CSC – here's a typical review: goo.gl/W0VZbQ – and for that sort of money it's so much of a steal you have to wonder if the police might get involved.**

* MILC = mirrorless interchangeable-lens camera; CSC = compact system camera. They're two of many abbreviations for the same thing.

▼ *Is it illegal to resell something marked with 'not for resale' or 'not to be sold separately'?*



Crowdfunding Corner

This week's crowdfunding projects help to make your existing hardware even smarter, from your phone to your car, at home and out. Where else can you get improvements like this?

HearNotes

Commercially speaking, no-one has quite managed to come up with a pair of wireless earbuds that work better than wired ones, which is why Kickstarter often seems like an appropriate place for people to try. The demand is clearly there, so why shouldn't someone try to fill it?

The HearNotes Wirefree Earbuds have been in development for 18 months now, and claim to be the only earbuds that deliver lossless, uncompressed audio without any wires to get in the way of the experience. The ergonomic design and construction from lightweight materials promises all-day comfort, while the universal transmitter with its own power supply ensures a strong signal with a range of 50-feet.

As well as the earbuds themselves, backers will receive a plug-in transmitter (compatible with any 3.5mm headphone port) and a study case with high-density foam insert to protect them while in transit. There's also an induction-based charging pad so that you can keep your earphones active, and a microUSB cable with wall adapter.

The hardware isn't cheap – early bird backers can still get a pair for \$259 (£171) if they're quick, but the full retail value is \$350 (£231) so in that sense it's a bargain. The project is aiming to reach \$75,000 and has already hit \$20,000 with over a month to go, so it's probably going to hit its target. If you're looking for wireless earbuds these might be costly, but they're also the last word in that particular luxury.

URL: kck.st/1zI7A7C

Funding Ends: Monday, June 8th 2015

GoFar

In-car computers vary wildly in quality, but it seems fairly clear that the GoFar is at least aiming to be very high-end. Its many tricks include helping you drive at the optimum speed for your engine's fuel efficiency, as well as providing tips on how to refine your driving style to reduce emissions, ways to lower wear on components and tracking of other metrics

The GoFar comes with a pair of simple sensors that log your trips and provide instant, clear response about your driving so that you can adapt your style as you drive to ensure you're always driving at your most efficient. An app allows you to get more detailed stats about your drive, as well as log different drivers and enter details such as fuel costs.

Its dashboard component is shaped so as to fit easily in any car. All you need to do is plug the provided dongle into your car's existing OBD (On-board Diagnostics) port (which most modern cars have) and then let the software do the work of calculating how well (or not) you're driving.

Early bird backers can get hold of the hardware by pledging as little as \$99 (£65), while the full retail cost will be \$149 (£98), so that's a fair amount of money to save by backing the Kickstarter. The \$50,000 goal is already 50% of the way to being reached, so if this sounds like something you want to try it's best to get in early before you miss out!

URL: kck.st/1GUMbb3

Funding Ends: Wednesday, June 3rd 2015



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Apple Bob

Classic gaming this week, developed by a classic gamer

Vertically scrolling platform games are rather thin on the ground these days. It's a real shame too, as some of the best games I've ever played have involved progressing up through the platforms towards an ultimate goal.

Take *Nebulus*, *Bucky O'Hare*, and elements from *Commander Keen*, for example. And what about the more static platformers, such as *Bomb Jack*, *Jumpman*, *Impossible Mission 2*, and *Chuckie Egg*, all classics and all thoroughly playable. Which brings me nicely to this week's app, a classic in the making and a game that harks back to a more civilised era of gaming.

Bobbing For Apples

Apple Bob, from Yippee! Entertainment, was developed by none other than the legendary Jim Bagley from Pixel Pyro Ltd.

It tells the story of Dash, who must traverse the platforms of 100 levels in order to free the queen bee from an evil corporation. It's simple stuff but immensely entertaining.

Along the way you'll come across Gloopers, ghost-like entities, who will slow you down should you run into them; a storm cloud that will electrocute you and stop you

from moving for limited time; and various collapsing sections of the platform, as well as gaps, moving sections of platform and spikes.

Thankfully, you can combat most of these dangers by collecting power-ups that will speed you up, allow you leap further or grant you temporary invulnerability. When invulnerable, you can run into the Gloopers and free the bees captured within, and race through the storm cloud and over spikes and other obstacles easily enough.

To complete a level, you'll need to collect all the fruit on the platforms within a certain amount of time. This naturally means much jumping, timing and legging it around the level to avoid the dangers while keeping an eye on anything else that may endanger Dash. It's not as easy as it sounds, and while the first dozen or so levels are relatively straightforward, the action soon gears up, and the level design becomes quite fiendish.

On completion of a level, after all the fruit has been collected, you're awarded a rain of bonus fruit as well as the individual letters B, O, N, U and S. Collect these, and you'll get a thousand points for each letter, as well as bonus points for the amount of time taken to finish the level and the amount of bonus

fruit you collected. If you're good, then you'll achieve three stars at the end of each level.

Conclusion

Apple Bob is a sterling little game, available for Windows phone and Windows 8.1, iPhone and iPad (iOS version is published through Strange Flavour Limited). It's easy to control, easy to get into, great fun to play, wonderfully developed and is exceedingly addictive, as well as devilishly tricky to master.

For a mere £1.19, it's worth every penny and will keep you and the kids entertained. Check it out in the Windows Store at goo.gl/rNX46E.

Features At A Glance

- Just £1.19.
- Loads of power-ups and objects to collect.
- Wonderful art work and graphics, plus a nifty little tune throughout.
- Clever gameplay, addictive and very entertaining.



▲ *Apple Bob*: platform gaming at its best



▲ Collect the fruit, save the bees

Logging Off

It dawned on me recently, after predicting the impact of streamed TV for some time, that a corner has been turned. When my youngest went to university to study law, as part of her support package I agreed to get her Netflix access, which as a Sky subscriber I wouldn't have considered buying just for myself. However, as the things offered on this service and others like them (Amazon) equal or outstrip equivalent satellite and ground based TV offerings, I'm starting to wonder if the game is up for our nation's traditional TV sources.

What's fascinating to me is that like a coiled right hook of a professional boxer, the streaming revolution always had the potential to deliver the knockout blow but no guarantee of full contact.

Yet, as Netflix and Amazon invest in producing top-quality shows that you can't initially see elsewhere, the pressure on traditional models is only increasing. What we're now experiencing is the full potential of cord-cutting, where instead of taking an expensive subscription from the likes of Sky, you can instead cherry-pick the programming you really want, and not bulk purchase things you've no intention of watching.

But this isn't an exclusively UK phenomenon, because it's also causing chaos in the USA, where historically cable companies have massively gouged their customers by offering stifflingly limited choice combined with amazingly high prices.

One of the biggest suppliers of these services, Comcast, overtook another Time Warner Cable to become voted by its customers as the Worst Company in America. Other luminaries in this list include the generally reviled agrochemical giant Monsanto and the PR fiasco that is SeaWorld.

When you factor also in that cable TV has the highest advert density, at more than 15 minutes per hour, no wonder people are switching off in droves.

The only things stopping an almost overnight revolution in TV viewing habits stateside is that the cable companies often control the internet speeds too, allowing them to sour the milk a little when they feel its commercially advantageous.

But they're fighting inevitability here, because the era when ABC, CBS and NBC could snag more than 50% of the American households for a season finale is way behind us.

As for our home-grown produce, the story is pretty similar, other than we're all forced to contribute to Auntie Beeb – even if we're

EDITORIAL

Editor: Anthony Enticknap
theeditor@micromart.co.uk

Designer: Laura Jane Gunnion

Designer: Kevin Kamal

Bonus John: John Moore

Contributors: Mark Pickavance, Robert Leane, Jason D'Allison, Joe Lavery, Sven Harvey, Simon Brew, Dave Edwards, Ryan Lambie, James Hunt, Mark Oakley, Ian Jackson, Roland Waddilove, Chocolate Flapjacks, Sarah Dobbs, David Hayward, Michael Fereday, Ian McGurran, Aaron Birch, David Braddock, Ian Marks, Craig Grannell, Kevin Pocock, Andrew Unsworth, Keir Thomas

Caricatures: Cheryl Lillie

ADVERTISING

Group Ad Manager:

Andrea Mason
andrea_mason@dennis.co.uk

Senior Sales Executive:

Karl Taylor
Tel: 0207 907 6706
karl_taylor@dennis.co.uk

Sales Executive:

Joe Teal
Tel: 0207 907 6689
joe_teal@dennis.co.uk

US Advertising Manager

Matthew Sullivan-Pond
matthew_sullivan@dennis.co.uk

MARKETING

Marketing Manager:

Paul Goodhead
Tel: 0207 907 6393

PRODUCTION

Production Coordinator:

John Moore
Tel: 0207 438 2074
MicroMartAdCopy@gmail.com

Digital Production Manager:

Nicky Baker

SUBSCRIPTIONS

Save 24% on the cover price:
£77.50 for 51 issues by credit card.
Visit subscribe.micromart.co.uk
Tel: 0845 126 1014

ONLINE SUBSCRIBER SERVICE

www.subsinfo.co.uk

Change your address, renew subscription or report problems: call 0844 844 0082 (UK) or email micromart@servicehelpline.co.uk

NEWSTRADE SALES

Newstrade Director:

David Barker

DENNIS PUBLISHING

Group Publisher:

Paul Rayner
paul_rayner@dennis.co.uk

Managing Director:

John Garewal

Group Managing Director:

Ian Westwood

COO: Brett Reynolds

CEO: James Tye

Company Founder: Felix Dennis

PUBLISHED BY Dennis Publishing

30 Cleveland Street
London
W1T 4JD
Tel: 0207 907 6000
www.dennis.co.uk

PRINTING

Printed By: BGP

Distributed By: Seymour

Certified Distribution:

13,712 average copies
Jan-Dec 2010





appalled by the way it can blow £100 million of our money on ill-considered IT projects or how it appears to have provided for many years an environment conducive to sexual deviants.

Surely, the continuation of this organisation must seriously be called into question at some point, because the workhouse system was an 'institution' and we shut those eventually.

That's not to say that people working under this umbrella can't produce great TV, but it isn't a mutually exclusive deal. I'm really enjoying W1A, even if I have a sneaking suspicion that it's just presenting real workplace conversations as divisive comedy.

The critical word here is 'relevance', and without it there is no future for a great many large organisations living on the kudos of ideas from the 50s and the massive viewing audiences of 70s Christmas specials.

Endings always come with a tinge of sadness, but given how good some of the streamed shows are, those who make good TV won't be short of opportunities elsewhere.

Mark Dickavance

LAST WEEK'S CROSSWORD

Across: 1 Cube, 3 Verbatim, 9 Refresh, 10 Metro, 11 Dodecahedron, 13 Meddle, 15 Slueth, 17 Neo-Darwinism, 20 Hydra, 21 Aqueous, 22 Galleria, 23 Ayes.
Down: 1 Core Dump, 2 Bifid, 4 Ephahs, 5 Bimodal Virus, 6 Tetrode, 7 Moon, 8 Percy Ludgate, 12 Chemists, 14 Dreidel, 16 Armani, 18 Irony, 19 Thug.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Certain members of the Micro Mart team (i.e. John) are more than a little bit excited about the latest Star Wars film, but at least one other person, who shall remain unnamed (Anthony), couldn't give two hoots about Tie Fighters, Death Stars or Jar Jar Binks. Okay, forget that last one; no one likes Jar Jar Binks. But poorly

computer-generated, Rasterfarian aliens aside, he's more of Trekkie. No, he doesn't go to the conventions or get dressed up as Captain Kirk (at least not in public), but he's happy to sit and watch back-to-back episodes of the Star Trek, whether it's the original series, Next Generation or DS9. For him, Spock trumps Skywalker every time. But although there's no little middle ground regarding which of the 'Star' franchises is best, there is at least one subject we can agree on: the royal baby. To put it bluntly, none of us care at all. As the Huffington Post put it, "A married mother has given birth to her second child." Of course, if they'd called the new kid Darth Vader or Jean-Luc Picard, we might have been interested. Maybe third time lucky?

THIS WEEK'S CROSSWORD

Across

- 1 A unit of power equal to one joule per second. (4)
 3 A hypothetical gas whose molecules occupy negligible space and have no interactions, and which consequently obeys the gas laws exactly. (5,3)
 9 The nodding muscles. (7)
 10 Unit of weight of one 16th of a pound avoirdupois. (5)
 11 People who perform actions via the internet in support of a political or social cause but regarded as requiring little time or involvement. (12)
 13 A document granting an inventor sole rights to an invention. (6)
 15 A broad area or strip of something. (6)
 17 Teach a person or group to accept a set of beliefs uncritically. (12)
 20 Fix or set securely or deeply. (5)
 21 A diffraction grating consisting of a pile of plates of equal thickness arranged stepwise with a constant offset. (7)
 22 Feel or express great loathing for. (8)
 23 A vertical member to which a horizontal piece is secured by screw or bolt. (4)

Down

- 1 A cross-platform mobile messaging app that allows you to exchange messages without having to pay for SMS. (8)
 2 .to TLD (5)
 4 A small part that can be considered separately from the whole. (6)
 5 The mass of an atom of a chemical element expressed in atomic mass units. (6,6)
 6 VSN International's comprehensive statistics software application with a Windows menu interface. (7)
 7 The movement of a read/write head to a specific data track on a hard disk. (4)
 8 The organisation of people at different ranks in an administrative body. (7,5)
 12 Reduced in worth or character, usually verbally. (8)
 14 Based on sound reasoning or evidence. (7)
 16 Provide evidence for or stand as proof of. (6)
 18 Give or provide in small portions. (5)
 19 A collection of data, programs, etc. stored in a computer's memory or on a storage device under a single identifying name. (4)



The Things That Frustrate Us About... The Internet

In the last of the series, we explore the ultimate annoyance: the world wide web

The online world is pretty much our world now. The people we work with or talk to on a daily basis are no longer just the people we physically come into contact with at work or near our homes; thanks to the web, most of us have friends all over the planet we can regularly chat with.

Plus there are all sorts of things we can now do online that used to take us longer and be more difficult, from registering to vote to managing our banks accounts to checking what time our local supermarket closes on a bank holiday. The internet has totally changed our lives over the past few decades, and a world without it is almost unimaginable.

So let's have a whinge about the things we don't like very much, shall we?

Argh! Arguments!

Obviously arguing isn't something that only happens online, but when it does happen online, it tends to be far more drawn out and potentially far nastier than it would be in real life. Partly that's because we come into contact with more people than ever before, with more likelihood of encountering someone with radically different viewpoints to our own, and partly it's because it's easier to be cruel from the safety of your laptop than when you're looking into someone's face. We all know we shouldn't do it, but who among us hasn't spent an evening fuming about something someone said online?

Fix it: When you feel an online argument brewing, take a moment to step back and think about it. Is it worth getting upset over? Usually not. If it is, that moment is helpful anyway, so you can formulate your thoughts properly. Also, if you see an argument already in process, try not to join in. It hardly ever helps.

Bah! Endless Memes

Cats. Poorly drawn frogs. Animated gifs from TV shows you haven't seen and acronyms you can't possibly decipher. The number of memes the internet generates on a seemingly daily basis is enormous, and it can feel like you can never switch off your computer if you ever want to understand a joke ever again.

Fix it: Know Your Meme (www.knowyourmeme.com) is your friend here. Don't understand why a particular phrase is suddenly trending on Twitter? Chances are the site can help. If not, it's probably a One Direction thing.

Doh! Complete And Utter Dependency

Is there anything more terrifying than trying to load up a website and getting a message in your browser that says you're not connected to the internet? Internet access is so commonplace nowadays and we've all become so dependent on it that it's hard to cope when suddenly our access is cut off. Going two weeks without a broadband connection at home after you move house is almost the most stressful part of the whole process!

Fix it: Don't panic. Look for nearby hotspots, particularly a BT Wi-Fi With Fon one, and you'll be able to connect to the internet again (though if you're not a BT customer, it'll cost you. Still, it might be worth it...).



Refurbished Laptops from **£49.99**

- Fully updated drivers & software
- 14-day Money back Guarantee
- 6 Months warranty

Free **Next Day** delivery on all laptops



EXCLUSIVE OFFER FOR MICROMART READERS:
£5.00 OFF ALL REFURBISHED LAPTOPS & DESKTOPS

Promo
Code:
MICRO2

Win a **FREE LAPTOP**



i5 Lenovo ThinkPad T510

- Intel Core i5 @2.53GHz
- 320GB Hard Drive
- 4GB 1600MHz DDR3 Ram
- 15.6" 1600 x 900 TFT HD Display



Want this free laptop?

VISIT: www.thequickclick.co.uk

Lenovo M58p SSF



Only
£75

- Intel Core 2 Duo
- 160GB HDD
- 2GB RAM
- Windows 7

With Promo
£70.00

Dell Optiplex 775



Only
£99.99

- Intel Core 2 Duo
- 80GB HDD
- 4GB RAM
- Windows 7

With Promo
£94.99

Lenovo ThinkPad T61



Only
£79.99

- Intel Core 2 Duo
- 80GB HDD
- 4GB RAM
- Windows 7

With Promo
£74.99

HP Pavilion TouchSmart 14



Only
£264.99

- 2nd Gen Intel Core i3
- 1TB HDD
- 8GB RAM
- Windows 8.1

With Promo
£259.99

WWW.THEQUICKCLICK.CO.UK

Dedicated, efficient & powerful

Ben Wallace, Director of drpdigital at drp
Fasthosts customer since 2010

NEW All-Intel Dedicated Servers

Our **NEW** dedicated server range offers the ultimate in reliability and performance. All our servers are custom built with the latest operating systems and powerful processors. You also get **unlimited** monthly data transfer, 100 Mbit/s connectivity, 24/7 UK support as well as a 99.99% uptime guarantee.

Give your business a server that meets your own budget and needs:

- UK data centres
- cPanel and WHM
- 24/7 UK support
- SSD technology
- Full remote KVM
- Up to 2 x 4TB storage
- Up to 128GB RAM



 TRUSTPILOT



Trustpilot rating correct at
time of going to print



Dedicated Servers from:

£29.00

per month

£29.00 ex VAT for 3 months then £39.00 ex VAT per month. 12 month minimum term contract. One-off set up of £49.00 ex VAT applies.

See website for offer terms & conditions.

Call **0333 0142 709**
or visit fasthosts.co.uk/dedicated-servers

SERVICES • WEB HOSTING • DOMAIN NAMES • EXCHANGE EMAIL

